

CCOS '80— Snowmass, Colorado

April 1980

CATJ

OFFICIAL JOURNAL
OF THE
COMMUNITY ANTENNA
TELEVISION ASSOCIATION

Oak stages a seminar in print.
Session 2...

Six steps to becoming a decoder expert.

Step 1. Evaluate your pay TV system needs. Do you want to offer just one pay channel, or are you planning to add a second or third pay channel in the future? This will impact on the decoder or converter/decoder you select.

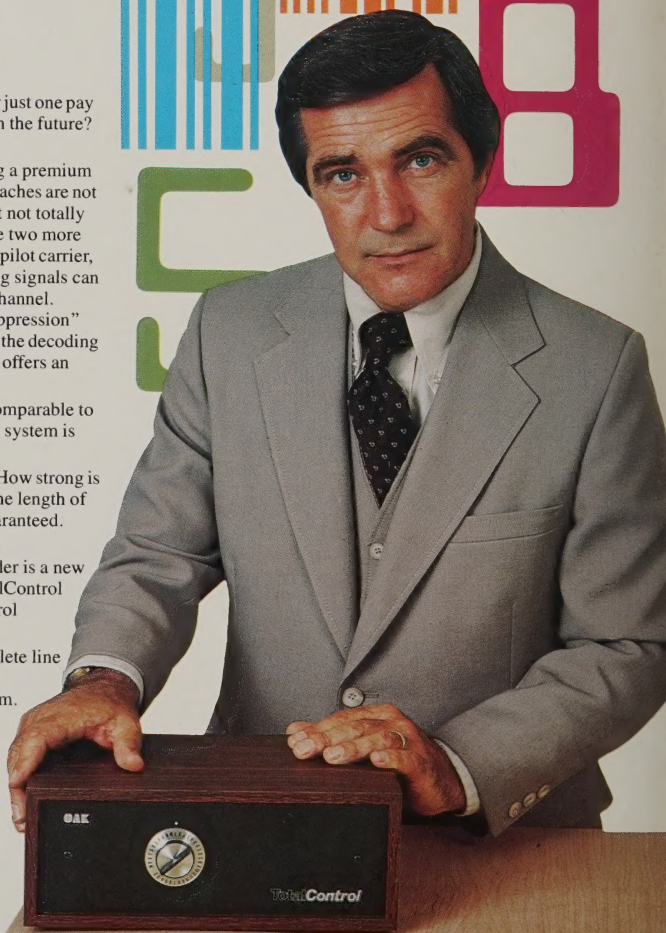
Step 2. Compare scrambling systems. Approaches to scrambling a premium program source vary among equipment manufacturers. These approaches are not equal. Inverted video and transposed rf carrier are two common but not totally secure techniques. Gated sync suppression and jamming signals are two more options. The gated sync technique requires a separate sync recovery pilot carrier, therefore using additional spectrum, often in the FM band. Jamming signals can produce interference thus causing the loss of at least one adjacent channel. Also, jamming signals can be trapped out. The "sine wave sync suppression" scrambling system is the answer. It's nearly impossible to defeat and the decoding information is "in channel." Only Oak offers this system. Oak also offers an optional pole mounted second level of security.

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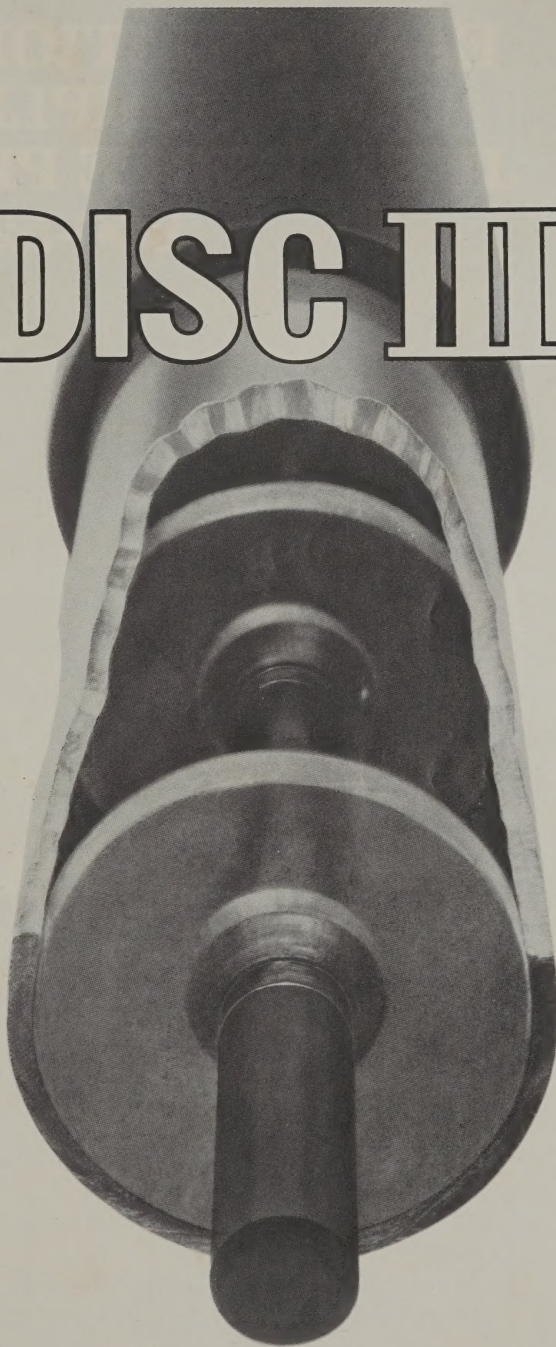
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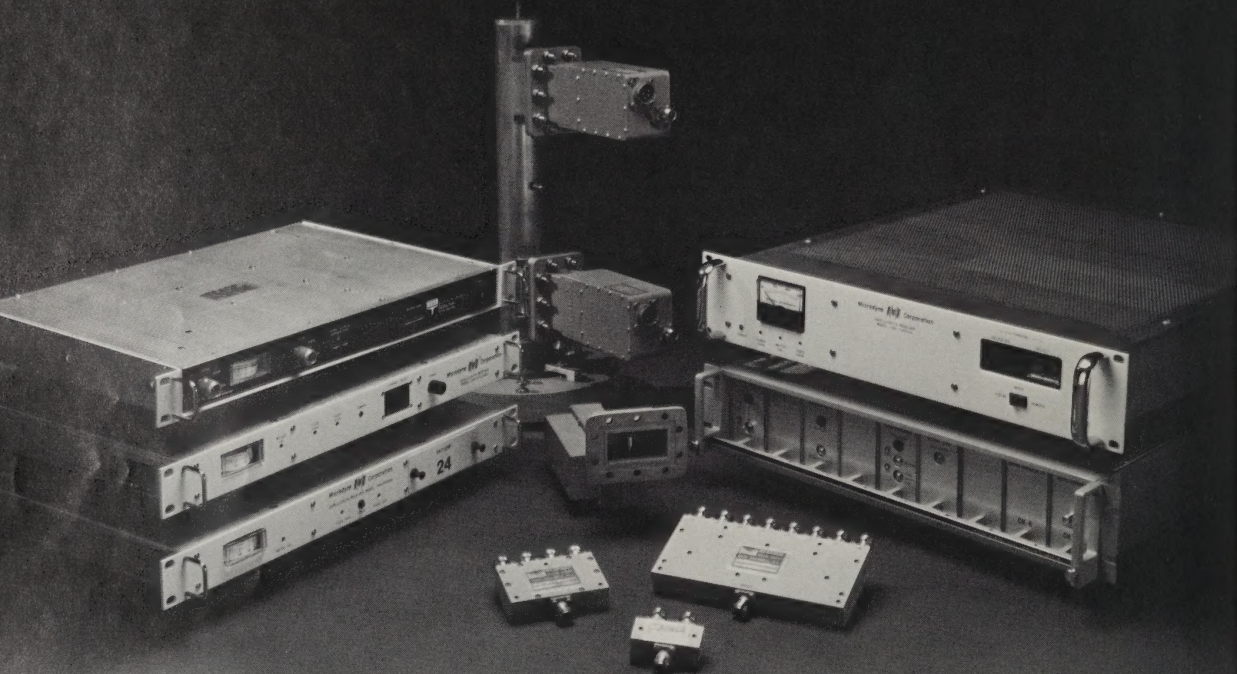
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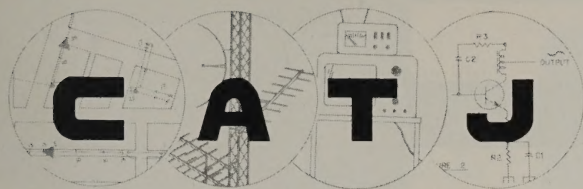
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OFFICES

CATA/CATJ
4209 N.W. 23rd, Suite 106
Oklahoma City, Oklahoma 73107
(405) 947-7664

CATA (Washington Office)
Steve Effros, Executive Director
1825 "K" Street, N.W.
Washington, D.C. 20006
(202) 659-2612

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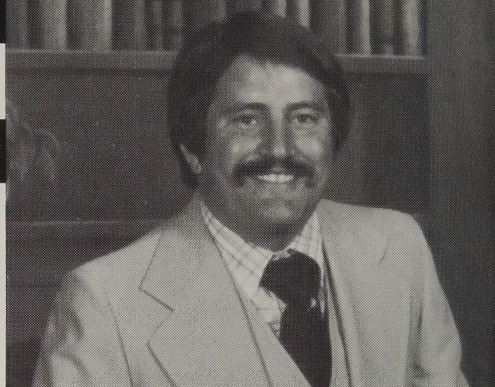
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— OUR COVER —

The April cover shows a portion of the Snowmass, Colorado village as it is nestled below the beautiful Rocky Mountains, and invites the readers to examine the article on CCOS '80 and register for this upcoming CATA event.

April 1980

BEN CAMPBELL, President of CATA, Inc.



THE ECONOMY AND CABLE TELEVISION — THE EXPERTS HAVE THEIR SAY

I was reading the newspaper the other day and in a banner headline on the front page it said "Economists Voice Despair" the sub-headline was "Radical Inflation Steps Urged". Well, this was nothing new, we have been hearing about the problems of our economy for many months now. You don't have to read a paper to find out about them either — all you have to do is go to the corner grocery — or, in our business, try to buy some coaxial cable to find out what has been happening recently. To be sure, it's a mess. But what do we do about it now?

Well, that was what this article was all about. It recited the proposals of a couple of the best known and highly respected economists from the entire political spectrum. They all said the same thing: we had better do something soon. One of the economists statements caught my eye, however, and I was struck with how relevant his remarks were for the cable television industry.

The economist was Barry Bosworth. He is now with the Brookings Institution "think tank" in Washington, D.C., a highly respected group of (usually) former government insiders who now have the freedom to say what they really think rather than toe the party line. Bosworth, before joining Brookings, was director of the Carter Administration's Council on Wage and Price Stability.

Anyway, what he was reported to have said is the following: among other things, he would "...serve notice on business and labor that they would no longer be protected from foreign competition", and then, according to the article, he would "...scour federal laws and regulations to find all the cost-boosting provisions that increase some special group's income at the expense of more inflation for everybody."

He hit on two very important issues to the cable television industry in that short statement — competition and government regulation. And what he said had to be done is exactly what the Community Antenna Television Association has been saying for a long time.

First, on the issue of competition, CATA has always maintained that competition is good, and that the federal government should not get in the way of free, open, marketplace competition in the

United States. Unfortunately, the most recent examples of some of the larger members in our own industry point in the wrong direction. We favor fair and open competition from any quarter, whether it be the Canadians or the telephone company. So long as the competition is fair, we don't think the government should get involved to protect us, or them.

Of course that is not the case today. With regard to the issue of telephone company involvement in the cable television industry, most competition that we have been monitoring lately comes about through government subsidies to the telephone company. Those subsidies allow the telcos to propose projects that are totally unreasonable from an economic standpoint for the private cable entrepreneur. Now, we do have a problem here, because, as the telcos are quick to point out, we could get the same funds, earmarked for non-profit corporations, that they are applying for. That is true. I just don't think the Federal Government should be involved in funding the communications media in this way at all. Profit or not. Sure, the funds should be available to build areas that cannot be built by private enterprise — but only in those areas. That is not what is happening now. The traditional argument is that you (the telco) have to serve the urban area in order to make the service of the rural area economical. But that means that the Feds are going to start dictating the communications needs of the urban areas as well as the rural areas and that I simply don't go along with.

The whole competition issue is raised again by the ongoing controversy about Canadian ownership. CATA's position is quite clear — as Bosworth says, let the businessmen know that they are not going to be protected from foreign competition. I don't think that that means that the Americans will lose, it will just mean that they have to do better. There's nothing wrong with that, and I am confident that they can do it. Trying to eliminate the competition by getting the federal government to do it is simply not the answer. We have had a long and painful experience with what can happen once the federal government says that it is the friend of cable. We don't need to repeat it on this issue.

Bosworth's comments about federal rules and regulations, and not having the federal government support one private interest group at the expense of the public were the ones that really hit a chord with me. I kept seeing the face of Jack Valenti when I read those lines.

As most of you know, Jack is the head, and a very accomplished one, at that, of the Motion Picture Association of America, better known as the MPAA. He represents the major movie producers who are the primary claimants in the war over who is going to get the copyright fees paid by the cable television operators. He is also the one who, by far is making the most noise about the need for massively increased copyright payments for distant signal programming. He maintains that without such massive increases the broadcast industry and probably the movie industry as well will be threatened by disaster.

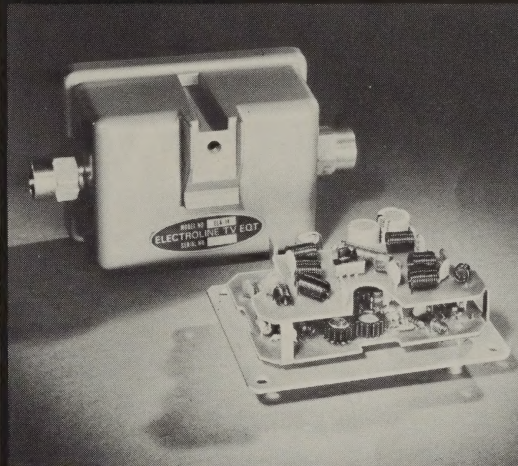
If anything is obvious, particularly in light of Bosworth's remarks, it is that anyone who is demanding, in this economy, that someone else has to pay more money for something should have a heavy burden of proof. That proof would consist, in this case, of showing that cable is, in fact destroying broadcasting. That it is in fact destroying the production studios, etc. Of course Mr. Valenti can't do that, because the facts simply are not there.

The same rationale goes for the FCC. They have already accumulated the facts. They show that broadcasters are not significantly affected in any way by cable carriage of distant television signals. So what is the problem? Why are they waiting to eliminate the rules which their own studies who are not justified? Maybe they haven't read what the economists are saying. Maybe they don't realize yet that it is because of their restrictive rules that the inflation rate is going up, that our cost for nonduplication switchers and syndicated exclusivity switchers and all the paperwork that goes in to all the reports and accounting statements are all reflected in the bill our subscribers get every month. When will the government understand that they are the cause of a lot of the price increases?

Of course as far as the Copyright issue is concerned, that goes right down the line with what Bosworth is saying. Are the broadcasters really about to expire? Of course not. Are the program producers really on their last legs? Their profit statements tell us otherwise. The Valenti yell for more copyright payments on the part of the cable television industry is simply another effort by an industry that is already doing very well to squeeze some more profit out of us, and through us, the American public. This will simply force our rates, and the inflation rates up. Congress must get to understand that by passing laws calling for more copyright payments they are simply forcing inflation rates up for the benefit of a small group of people who are simply seeking larger and larger profits at the expense of all of us. It's time to put a stop to it.

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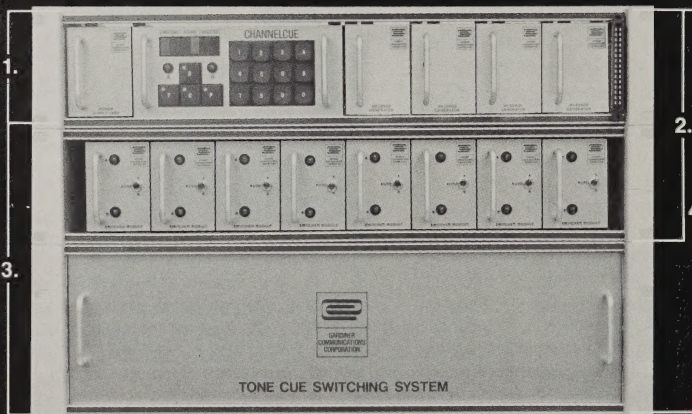
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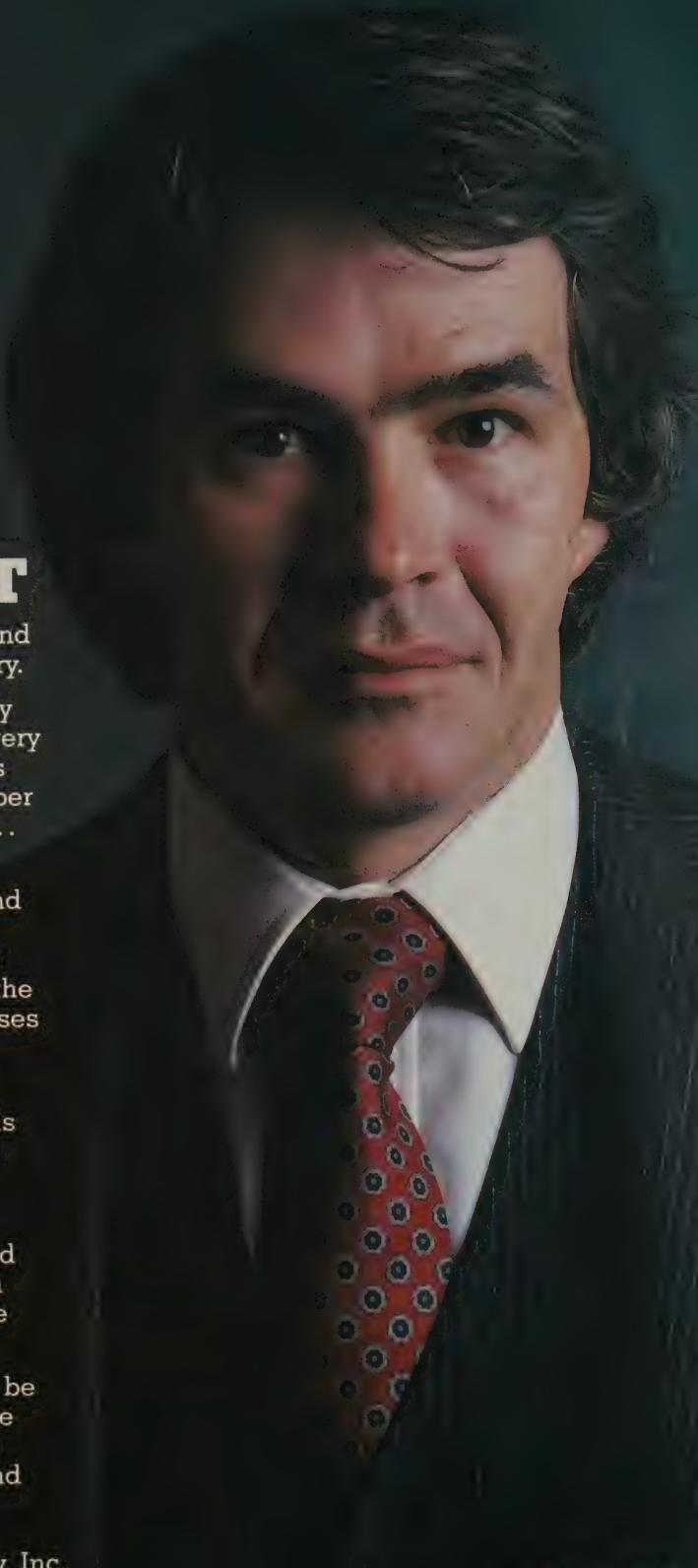
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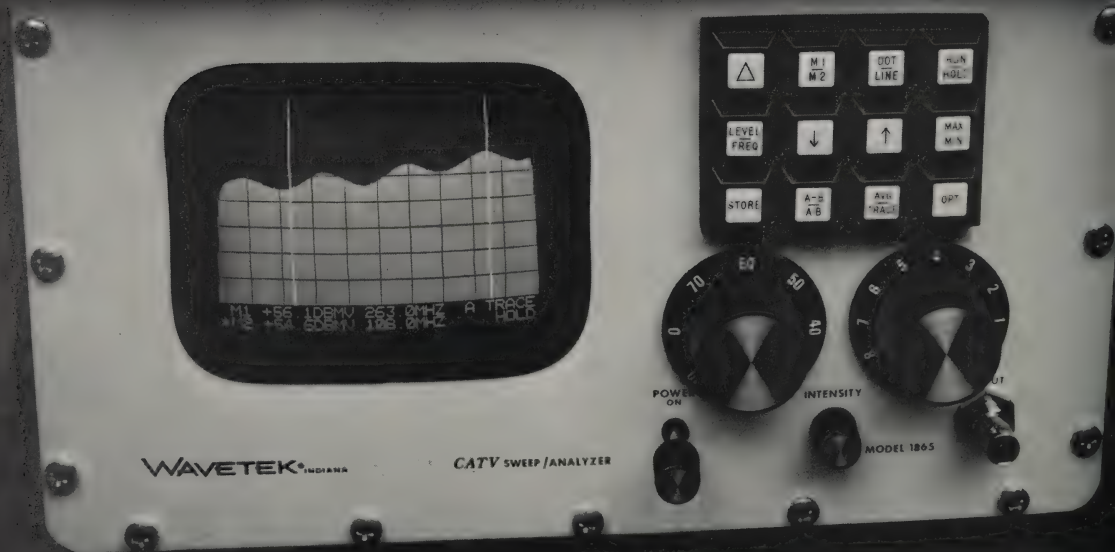
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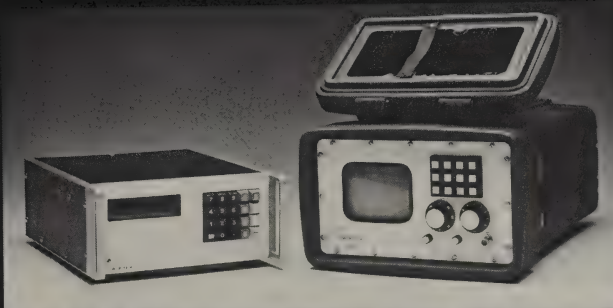
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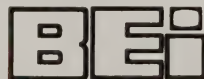
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CATJ LAB TAKES A LOOK AT THE NEW RMS "POWER-KING"

The task of providing power to a modern CATV system entails many things. One must not only provide the proper amount of voltage and current, but it must be done **reliably** and, more importantly, **safely**.

Nothing is more disheartening than to discover that, after a power outage, you've lost a string of amplifiers and, you, in all likelihood, suspect, and you are probably correct, that the surge of initial turn-on got them.

It's also quite upsetting to find that you've lost the whole west end of town because of one power supply failure. One of the newest products on the market today can help take that worry from you, and CATJ appreciates the opportunity afforded to their lab to test and review the new RMS "POWER-KING" Power Supply.

Basically, when looking for power supply, we must consider several points of technical criteria in selecting one of good power supply design:

1. **Reliability**—a **must**; in these moments of emergency, you have to have a piece of equipment that you can count on to perform;
2. **Protection**—it must provide a certain amount of protection, not only for itself, but for the amplifiers it is connected to;
3. **Installation**—ideally, this is a piece of equipment that we would like to install and then **forget** it, knowing that you can rely on it.

The new RMS "POWER-KING" Series of power supplies, in 30 Volt systems, as well as 60 Volt and 60/30 Volt, seems to accomplish the above tasks quite handily, and we are happy to recommend this equipment for cable systems shopping for a reliable power supply.

Housed in a (17 $\frac{1}{2}$ x 10 $\frac{1}{2}$ x 8 $\frac{1}{2}$) all-weather metal cabinet, the "POWER-KING" converts 115 volts AC to a regulated square wave output. The output voltage is dependent upon the model, their being **five**. The PS-30 which provides 30 volts AC at 14 amps, the PS-60 providing 60 volts AC at 14 amps, and the PS-30/60 which is capable of delivering either 30 volts AC at 28 amps or 60 volts AC at 14 amps.

Figure #1 is a schematic of the PS-30 which we will use in our discussion, as this is the model actually tested in the CATJ Lab. The other models are carbon copies of the PS-30 except for the transformer itself.

You will note that the power supply consists basically of a 115 volt AC input circuit, a transformer, a low voltage output circuit, and various protection devices.

The heart of the "POWER-KING" series is the **ferro-resonant transformer**. A ferro-resonant transformer, also known as a saturable reactor, is a device designed to maintain a **regulated** or **constant** output A.C. voltage, within certain limitations, over a large range of line and load variations. Regulation of 2% is not

uncommon for input line voltage variation of 10% and load variations of up to 25%.

Regulation in this type of transformer is a result of a capacitor terminated third winding in the secondary portion of the core.

The inductance of the winding and the capacitor form a **resonant circuit** whose frequency is set at 60 hertz. When 60 hz is applied to the primary, a heavy current is set up in this resonant circuit. The **resultant flux** (the magnetic field set up in the transformer core) due to this current, aids the main core flux. This large flux value, which occurs each half cycle, drives the core of the transformer to very near magnetic saturation.

In a transformer, energy is transformed from the primary to the secondary via the flux flowing through the core material. If the core becomes saturated, no further increase in flux lines is possible even though the primary current increases.

The transformer does not operate at full core saturation at all times, it is designed, in fact, to take advantage of the non-linearity of the magnetic curve **near** core saturation.

The output wave form of this type of transformer is a **square-wave** becoming more so as the input voltage increases.

The result of all this is that the secondary voltage is an almost constant-amplitude square wave. Additionally, the ferro-resonant action of the transformer exhibits a current limiting characteristic that keeps the **short circuit** current of the secondary to a relatively safe value.

The transformer used in the "POWER-KING" series is rated class "**H**" which means that the material used in manufacturing (wire and insulation) are capable of withstanding working temperatures of **339 degrees fahrenheit** (170° C) on a continuous basis.

Providing a regulated A.C. voltage of the proper value is one thing, providing it **safely** is quite another. As we all know, voltage transients, which occur in a CATV system, can cause havoc at the amplifier, and a properly designed power supply can go a long way in suppressing these voltage transients. This is particularly true when one realizes that most damage causing transients come in via the power line itself.

The "POWER-KING" series uses several systems to aid in reduction of damage causing spikes. These devices not only protect the power supply itself, but, at the same time, they reduce the chances of amplifier damage. Transients are generated by both natural and man-made sources. Lightning, of course, is the most common natural generator of surges. A direct strike is usually very catastrophic; however, most CATV electronic equipment damage is not caused by direct hits, but rather by voltages induced from nearby conductors (telephone lines, power lines, and etc.) as a result of a direct hit to them.

A direct strike, for instance, almost anywhere in the power grid, will induce spikes of varying intensity throughout the system. Your CATV system, being connected to this power grid, is the unhappy recipient of these surges.

Another source of surges are the man-made variety and are usually caused by the inductive **kickback** of motors, solenoids, transformers, and relays. It is not uncommon to experience transients of several thousand volts from these sources.

The "**POWER-KING**" series power supplies use a variety of protection devices to suppress or completely eliminate these surges.

First, there is an **automatic reset 10 second turn-on** time delay relay. When voltage is restored after a power company outage, the CATV equipment is protected from transient voltage produced by the initial turn on. The relay used by RMS for this purpose is a sealed unit and is rated at almost 40 amps. Extra sets of contacts on this relay provide for additional functions, such as remote monitoring of power supply operation, or control of other peripheral equipment.

Another transient protection device incorporated in the power supply is the use of two metal oxide varistors in the primary circuit of the transformer. The primary function of these M.O.V.'s is to react **very rapidly** to fast rise time transients which may be present on the 115 volt A.C. input line.

When the breakover voltage of the M.O.V. is reached, it becomes a short, thereby preventing the transient from reaching the primary of the transformer. When the over voltage is no longer present, the M.O.V. returns to normal, ready for the next surge. Each of the M.O.V.'s used in this unit has a maximum surge capability of approximately 4000 amps.

The output of the power supply also has its surge protection system. It takes the form of a gas discharge tube. This tube has a maximum discharge current rating of approximately 10,000 amps. This transient and surge protector also prevents harmful

transients picked up by the cable line itself from causing damage to amplifiers and line extenders served by this line.

Not related to surge protection, but nevertheless a very necessary protection device, is the use of a circuit breaker in the primary of the supply. This circuit breaker is of the switch/reset type and also serves as the **On-Off** switch. Operation of the circuit breaker does not turn off the 115 volt A.C. convenience outlet as it was designed that way and has the advantage of being always hot.

The output circuit consists of a pi type RF filter which uses an iron core, R.F.C. and a couple of .01 fd capacitors rated at 1.6 kvolt. The action of this output filter network isolates the very low impedance of the secondary winding of the transformer from loading down the R.F. carried on the 75 ohm cable and prevents loss and degradation of the R.F. signal. Many CATV power supplies now offered on the market **omit** this output circuit entirely.

Some of the not-so-technical features of the "POWER-KING" series round out the features of this product. There are the pilot lamps on the primary (a red neon) and on the secondary (a green L.E.D.). Both of these lamps are mounted in the bottom of the supply and are visible from ground level.

The housing is of all steel construction with baked on enamel and is designed to exhibit a chimney effect to facilitate cooling.

Shown as box material is the warranty offered by RMS on their "POWER-KING" series as well as technical summary information.

All in all, CATJ found the RMS "POWER-KING" series as a rugged, well built power supply, meeting the most demanding criteria of the cable operator—that being, install it and forget it!! What better recommendation!!

"POWER-KING" WARRANTY

Each "POWER-KING" power supply is guaranteed against defects in workmanship, material and component failure for a period of fifteen (15) months from the date of invoice under the following terms and conditions:

1. This guarantee includes replacement of parts and cost of labor for the replacement thereof for any defects discovered prior to and during the initial installation of this unit. Under these conditions, RMS Electronics, Inc., will be responsible for return shipping charges as well.
2. Once a unit has been installed and in use, the guarantee herein provides for a no charge replacement of parts only, with labor costs for replacement of said parts to be paid for by the customer. Charges will be made at actual factory labor costs. Shipping charges and labor charges under these circumstances will be at the customer's expense and will be so invoiced.
3. This guarantee does not include damages by Acts of God such as lightning strikes, flood or damages caused by wind storms, hurricanes or tornados, etc. Nor does this guarantee include damages caused by vandalism, abuse and misuse, and use beyond the prescribed specifications of the unit. In the event this unit is repaired by a person or persons unauthorized by RMS Electronics, Inc., this guarantee shall be considered null and void. Further and in the event that the buyer replaces components not of the same or equal to the original specifications or quality in the unit, then in such event this guarantee shall be null and void.

RMS Electronics, Inc., reserves the right to make the final decision as to whether or not this warranty is applicable to any unit returned by or requested to be returned by the buyer.

NOTE: Return authorization for any unit claimed to be defective under this warranty agreement, must first be obtained in writing from RMS Electronics, Inc., and such unit when so returned must be shipped on a freight prepaid basis only.

GUARANTEED 96 HOUR "BURN-IN" TESTING

Each "POWER-KING" power supply is guaranteed to have completed a ninety-six (96) hour comprehensive "burn-in" test procedure prior to shipment.

The tests include a three (3) stage inspection. Each unit undergoes a 100% mechanical inspection and electrical testing of every individual component.

The second stage requires "in-process" assembly inspection with a final third stage assembly completion test.

Final assembly testing guarantees that each power supply is placed upon the 96 hour "burn-in" rack. This process includes working the unit in excess of maximum rated amperage capacity into a "dummy" load for a continuous time period of not less than 96 hours. During this period, power is interrupted periodically to simulate and generate typical "in use" transient surges.

TECHNICAL SUMMARY

FERRO-RESONANT TRANSFORMER

A ferro-resonant regulating transformer is a unit that can maintain a "regulated" or "constant" output voltage, within prescribed limitations, over an extensive range of line and load variations. Regulations of a low percentage (2% nom.) are typical for input voltage changes of $\pm 10\%$, and load changes of 75% or more.

The regulating characteristics of this type of transformer is the result of a capacitor-terminated control winding on the secondary portion of the core, i.e., a capacitor that is connected to a separate capacitor-winding on the transformer.

When a 60 cps voltage is applied to the primary winding, the central branch is resonant and a heavy current flows through the capacitor. The resulting flux (i.e.: magnetic field, set up in laminations) due to this current, aids the main core flux. At one point of the input voltage half cycle, the sum of the two fluxes reaches a saturation value. Therefore, a magnetic shunt confines the saturation to the secondary

portion of the core. The transformer operates in such a way so as to take advantage of the non-linearity of the magnetic curve near core saturation.

An increase of input voltage, above the value that saturates the transformer, has a negligible effect on the secondary voltage. The transformer remains saturated until the total core flux drops below saturation value. The process is repeated every half cycle, consequently, normal variations in the line voltage (i.e., those occurring above the voltage level at which saturation occurs) do not effect the secondary output because of the voltage limiting effects of core saturation.

As a result, the secondary voltage is an almost constant-amplitude square wave. Additionally, the ferro-resonant action of the transformer exhibits current limiting characteristics that curtails "short-circuit" current of the secondary to a relatively safe level.

The operating specifications for the ferro-resonant transformer takes into consideration the environmental aspect of operating under high temperatures (worst case possibility) and exceeds the requirements of the Underwriters Laboratories (U.L.).

The transformer is rated Class "H". This means that the materials used for manufacturing (wire and insulation) are capable of withstanding a working temperature of +356 degrees fahrenheit (170° C.) on a continuous basis.

THREE TRANSIENT SURGE PROTECTIONS

a) Time Delay-Relay:

An automatic reset 10 seconds "turn-on" time delay is a standard incorporated feature in all "POWER-KING" Series power supplies.

After a power company outage, the cable T.V. system is protected from transient voltage surges generated by the initial "turn-on". Usually these transient voltage surges are created by inductive components, i.e.: motors, transformers, and other devices.

b) Primary Input Circuit Protection:

Lightning generated voltage transients, that are present in the 115 volt AC input circuit to the power supply, are effectively shunted to "ground" by two (2) metal oxide type surge protectors. Each metal oxide type protector has a maximum transient capability of 4,000 amperes.

c) Output Circuit Protection:

A non-polarized gas filled, long life, self re-setting, surge protector is built into each "POWER-KING" Series power supply.

The gas filled surge protector has a capability of handling a maximum discharge current of 10,000 amps. It has an operational "life-span" rating of at least three times the amount of single impulse discharges that types usually used in competitive power supplies.

NOTE: Surge Voltage Protectors (SVP's) are hermetically sealed gas discharge tubes consisting of two (2) electrodes properly spaced by insulators and filled with a special gas. The prime purpose of the "SVP" is to provide a conductive path for undesirable excessive transients, thereby preventing the transient energy and associated voltage from damaging equipment, components, etc.

ON-OFF PRIMARY OVERLOAD CIRCUIT BREAKER

Each "POWER-KING" Series power supply is designed with a built-in "ON-OFF" primary overload circuit breaker that is UL (Underwriters Laboratories) approved.

The switch type circuit breaker will interrupt 10 times its rated value. Example: with a 60 volt or 60/30 volt 20 amp. unit the circuit breaker will interrupt up to a 200 amp. surge. With

a 30 volt, 15 amp unit the circuit breaker will interrupt up to a 150 amp surge.

The operational life rating for this type of circuit breaker is over 20 years, or, approximately 6000 surge interruptions.

RF FILTER CIRCUIT

All "POWER-KING" power supplies feature an RF filter circuit that prevents "on-line" coaxial cable RF from entering into the power supply circuitry. This filter circuit consists of an iron core inductor and two (2) bypass capacitors.

Each RF bypass capacitor, used in the "POWER-KING" Series, is rated at a working voltage of **1500 volts** to assure optimum performance. Competitive power supplies usually utilize RF bypass capacitors that are rated at a working voltage of only **500 volts**.

INPUT-OUTPUT PILOT LIGHT INDICATORS

Each "POWER-KING" power supply provides, as a standard feature, individual input and output pilot light indicators that are positioned on the bottom of the housing so that they are easily visible from ground level.

A bright Red color neon indicator light is located on the 115 volt AC input circuit.

The output circuit has a Green color LED (Light Emitting Diode) indicator light that has a 20 year ½ Life Rating. Example: After 20 years of operation the LED light indicator will still retain one-half of the original brilliancy.

CONVENIENCE OUTLET

Each "POWER-KING" power supply is equipped with a 115-volt AC auxiliary output jack.

HEAVY GAUGE STEEL HOUSING

a) The "POWER-KING" power supply provides a rugged and durable steel housing that has an additional "all-weather" baked enamel protective finish.

The highest specification standards for outdoor application, assures that the housing will resist environmental degradation and corrosion. These specifications meet or exceed the requirements of Bell Laboratories, Western Electric Co., General Telephone Electronics, and the Rural Electrification Agency of the United States Department of Agriculture.

Reference Information:

Western Electric Co.:
Bell System Documents

General Telephone Documents:
Federal Government:
Munsell Co.:
ASTM:

X-18020 latest issue with attachments.
OS10982, OS10040, WL2145, WL2232, MS17000
Sections 1086, 1094, 1102.
AES/GTS 8536 latest issue.
REA PE-35, PE-79 latest issue; Federal Standard No. 595.
Color standards.
Standards and specifications.

b) The mechanical design includes ventilating louvers with effective insect screening. A special chimney effect creates a constant circulating and cooling air movement to maintain a safe internal operating temperature level.

For more information, contact RMS, 50 Antin Place, Bronx, N.Y. 10462, or call toll free (800) 223-8312.

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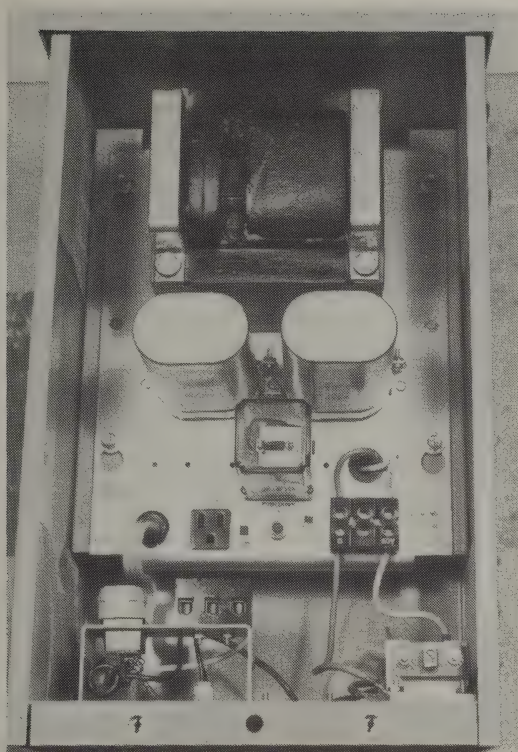
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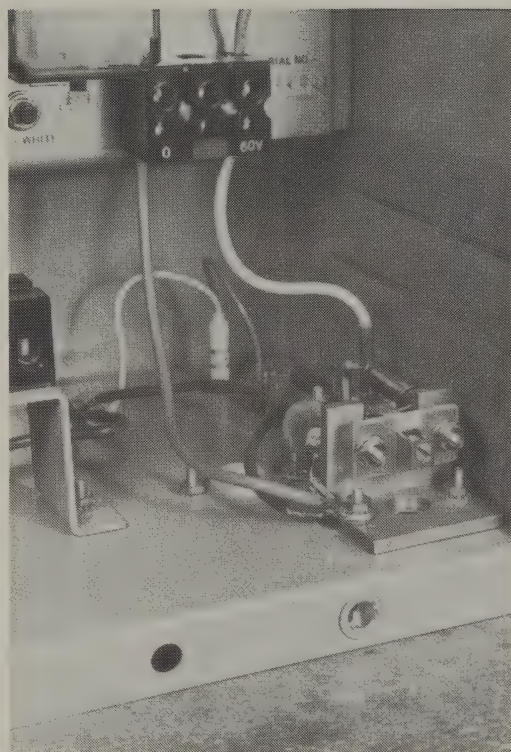
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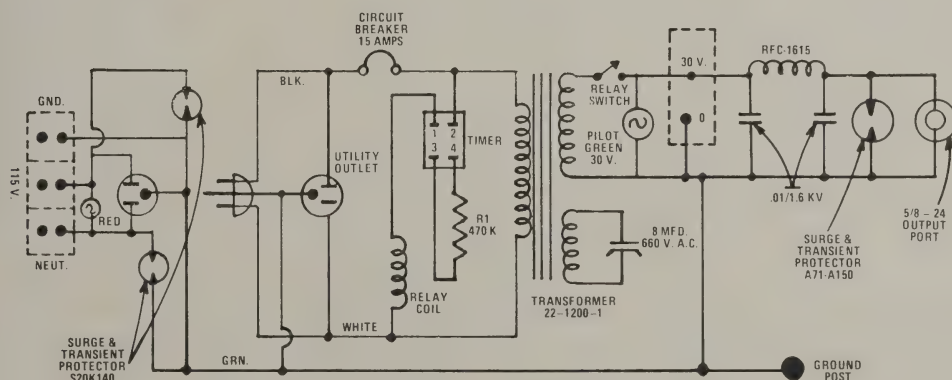




Interior View of power supply.



(Lower right) Output connector block.



MODEL PS-30
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- Bonding & Grounding
- Aerial Construction
- More Management Articles

IN GRANT'S PASS, OREGON, FOLKS ARE WILD OVER THE CAVEMEN, THE LOCAL DJ, AND TWO PREMIUM PAY SERVICES.

Grant's Pass people are big on entertainment. How big? No one could really tell until Southern Oregon Cable TV introduced Showtime and (dare we say it?) Home Box Office to an existing cable market last October. The industry didn't quite know what to expect—after all, Grant's Pass was an existing cable system in a classical cable market. Would the folks be interested in still more channels? Yes!

As of January 10, 1980, the figures show that of all the cable homes opting for premium pay TV, an astounding 69.6% have chosen both SHOWTIME and the other maxi service!

Why?

Because Southern Oregon presented a total entertainment package to Grant's Pass. With a simultaneous launch of two premium services and six days of heavy free previews, Southern Oregon showed its audience the way to maximize their viewing options. And most subscribers took both premium pay services so they wouldn't "miss anything."

And they got it all.

Many of you think the two services offer the same programming. They don't.

For instance, Showtime offers a

wide range of totally unique blockbuster specials. Superstars like Elton John, James Taylor, Tony Bennett, Crystal Gayle, and Mitzi Gaynor taped live in concerts from Moscow to Nashville. Dazzling Las Vegas reviews. Uncensored comedy from Chicago, New York, Houston, and San Francisco. Exclusive productions of Broadway and Off Broadway shows. And movies and mini series produced especially for us.

Packaging the two pay services together, Southern Oregon was able to give the Grant's Pass audience more options, more convenience, and better selection than ever before. The Cavemen, Grant's Pass' Booster organization, went wild.

In both existing and new build cable systems, Showtime is committed to working closely with the cable system to successfully package these dual service advantages to the consumer.

The teamwork pays off.

In this existing cable, dual market situation, both Showtime and the other major pay service experienced high penetration numbers and overwhelming success. And the affiliate reaped the benefits of both!

By offering Showtime and another



pay service,
Southern Oregon's maxi pay
revenue increased by a whopping 60%.

We'd like to do the same for you.

So why not call one of our regional representatives and let him help you build a package for your market? When you do, you'll find out what we've been saying all along.

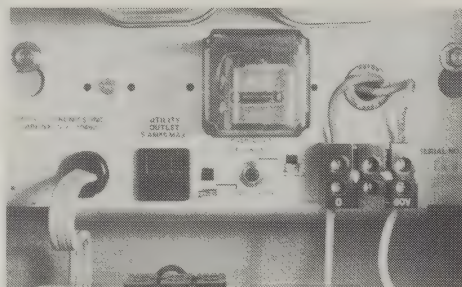
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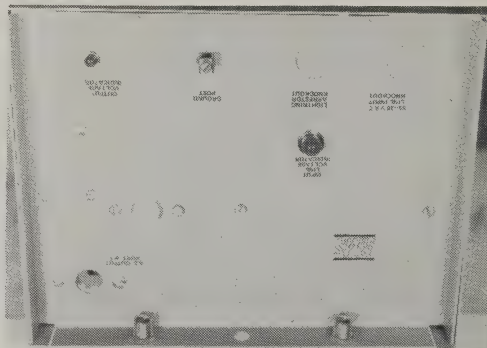
115 VAC
Input

Utility
Outlet

Circuit
Breaker
Delay
Relay
(Above)

Low Voltage
Output

Lower portion of power supply chassis.



Bottom view of power supply.

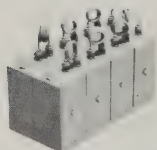
CATJ CONGRATULATES HARRY SADEL AND SADELCO, INC. ON GRANTING OF PATENT

CATJ has learned that **Sadelco, Inc.**, celebrating their 20th anniversary, has been awarded a U.S. Patent covering a "METHOD and APPARATUS for Measuring Television Sound and Picture Signals".

Sadelco is a recognized leader in the manufacture of signal measuring instruments and ancillary equipment, and this U.S. Patent will enable the company to maintain its leadership in the industry.

CATJ and CATA extend their congratulations to **Harry Sadel** and **Sadelco** on this outstanding achievement.

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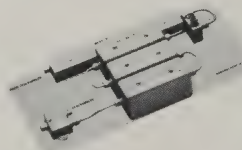
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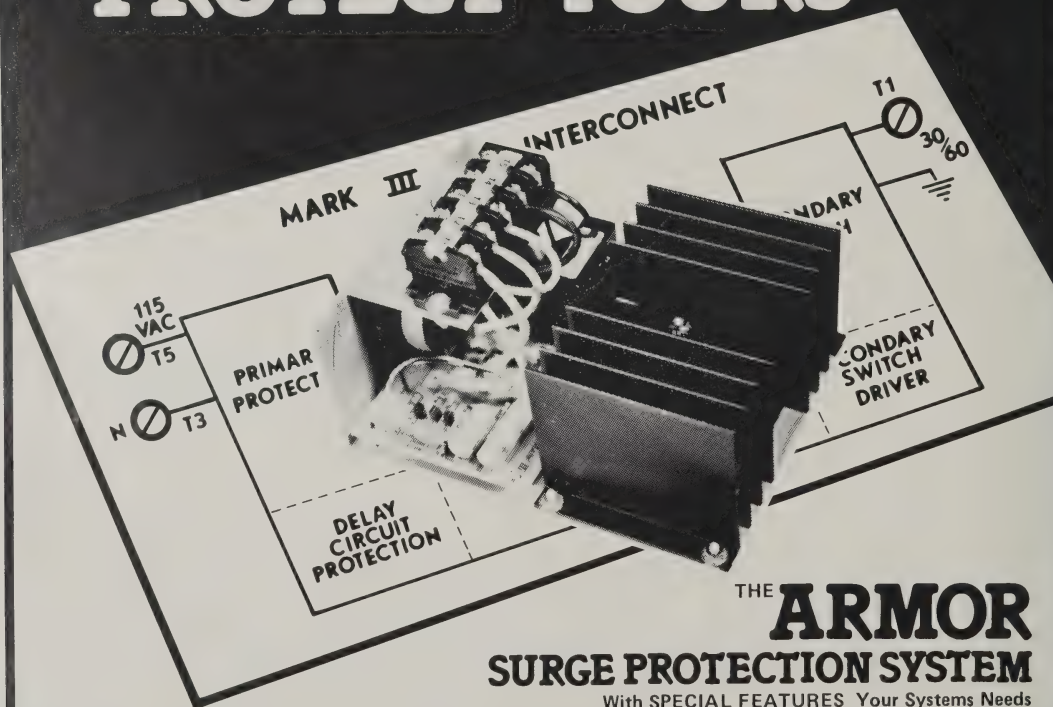
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THE ARMOR MARK III is a self-protected device for providing surge overvoltage protection at each powering location. Each MARK III contains a preset time delay which ultimately controls time from primary line application to constant voltage transformer output.

SPECIFICATIONS:

Electrical: Working Voltage: 30—60 Vrms constant voltage transformer output; **Switching Current:** 25 Amp rms maximum; **Surge Capacity:** 10,000 A peak; **Primary Interrupt:** Thermally activated, self-resetting, 10 Amp circuit breaker backed up by a 30 A fuse; **Secondary Delay:** User specified, 3 seconds standard; **Operating Temperature:** -25°C to + 125°C.
Mechanical: **Mounting:** Single ¼" bolt. **Interconnection:** Two, 4 pin connectors.
Accessories: Preassembled interconnecting harness with 18" leads, waterproof housing to facilitate external mounting.

MARK III may be installed into most existing power supply housings such as Sola, Vikoa, Glenetronics (Sawer Industries), later version Jerrold, Sylvania. Early Theta Com, Jerrold, some Ameco models do not provide adequate space, requiring external waterproof housing.

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July 27-31, 1980

It's hard to believe that it's time to register for CCOS-80, but registration time is upon us for sure. Having visited the Snowmass Village to complete the arrangements for our meeting, we can assure you that the participants and their families are in for one of the highlights of their lives, as the extreme beauty of the area will absolutely overwhelm you. The village is nestled in a magnificent scenic valley in the Rocky Mountains, surrounded by tall forested mountains, tumbling streams, the fresh scent of aspen and pine, and the magnificent colorama of the heavenly blue skies—the wondrous mountains of Colorado will delight you with the clear, fresh, invigorating air and afford the relaxation of peace and quiet—NATURE at its finest!!!



Add to this the charm of the village with its different chalet-type facilities and all the recreational avenues open for your enjoyment. Aside from the swimming and tennis, there is also available raft trips, mountain Jeep tours, horseback riding, sailboat rentals, chairlift rides (to 12,000 feet on the ski-lifts), sunrise breakfasts and golf at the PGA class A 18-hole golf course. One of the highlights of our program will be the last night's social event—our annual barbecue and then admission to the Snowmass Rodeo. (If there are some aspiring bull riders among the group, we might be able to fix it up for you to enter!!)

This will be a delightful setting for your family to accompany you for a very relaxing and memorable vacation. They can find plenty to do while the cable operators are busy at the sessions.

The Program Committee, headed by Ralph Haimowitz, CATA Director from District #4, has been working since last year's seminar upon details for this year's CCOS, and has tentatively arranged the program. As the

CCOS-80 CATA REGISTRATION FORM—Snowmass, Colorado, July 27-31, 1980

Enclosed is \$_____ (\$100.00 for **each participant**) for registration fees for CCOS-80 to be held July 27-31, 1980, at Snowmass Colorado. I understand that upon confirmation of this registration I will receive the necessary papers for hotel reservations.

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SNOWMASS INFORMATION

GETTING TO SNOWMASS

Snowmass Village is located 210 miles Southwest of Denver, Colorado. Air transportation from Denver is available on both Aspen Airways and Rocky Mountain Airways. Flying time to Sardy Field (8 miles from Snowmass Village) is approximately 35 minutes. Taxi and limousine service and courtesy cars all serve the airport. All major car rental agencies are located near the Airport.

Passenger bus service (Trailways) and all major car rental agencies are available in Denver. Snowmass Village is an enjoyable four-hour drive via Interstate 70 and the Eisenhower Tunnel or via Independence Pass.

Snowmass Village is also accessible from Grand Junction, Colorado (approximately 130 miles West). Grand Junction is served by United and Frontier Airlines. Trailways Bus service is available as are all major automobile rental agencies.

HANDICAPPED ACCOMMODATIONS:

Handicapped persons wishing lodge accommodations for the annual meeting should request either the Mountain Chalet or Silver Tree/El Dorado Lodge. If condominium accommodations are requested, the Stonebridge Condominiums should be requested.

CAMPING:

There are **no camping** facilities at Snowmass. **No recreational vehicles** are permitted in the Village.

The Aspen KOA Kampground is 18 miles away—a 25-minute drive from Snowmass. Reservations should be made far in advance as there is limited space available.

Reservations are not accepted at any Forest Service campground and there are limited spaces available.

CREDIT CARDS:

Some of the lodges and condominiums take national credit cards. Most accept only travelers checks, personal checks, or cash. Your housing confirmation will specify what credit cards are available.

Restaurants and shops are independently owned and operated and cannot, therefore, put charges on your room bill. Be prepared to pay in cash or credit card at these places.

ALTITUDE:

Snowmass is located 8,600 feet above sea level. Adjusting to this altitude takes time. Anyone with a history of **heart, circulatory, or lung disease** should check with their doctor before coming to a high altitude. Respiratory infections or pneumonia should be completely resolved since they can be worsened by the extra strain.

WEATHER:

In July the days are generally warm with temperatures in the 70's and low 80's F. The evenings are cool. Brief thunder showers can be expected in late afternoon.

SARDY FIELD—ASPEN AIRPORT

F.A.A. Tower, runway length 6,000 ft. + 500 ft. over run. Altitude 7,794 ft. Tie down facilities \$7.50 in 1979 per nite, 100 tie downs. Largest plane: jet star II (4 engine, private jet.)

RATES:

The rates for properties are as follows:

Wildwood Inn	\$34.00	single or double occupancy
Pokolodi	34.00	single or double occupancy

speakers and panels are finalized, we will provide that information, but the program is shaping up to provide sessions that will be most worthwhile for you. Information taken from last year's program survey indicated to us what it was that you wanted most, and the Committee has worked towards that end.

One innovative scheduling for this year's program will be the OPEN FORUM which will be an informal gathering, at the present time scheduled for two different times, where the cable operators, technicians, engineers, and manufacturers can come together to allow an open exchange of information on any aspect of cable television. We anticipate questions on equipment and products, construction, system testing and repair, problems for the techs, and just general discussion about how to do a better job with your system. The nucleus of this session will be keeping the conversation moving, and having the **right** people there to answer the questions—we feel like this has been covered as different manufacturers have been contacted to furnish their technical people for this session. We are looking forward to this being a great opportunity for learning and exchange of ideas and suggestions.

We are also happy to announce that the Rocky Mountain Cable Association will be having their annual meeting in conjunction with ours, taking advantage of the exhibits and technical sessions, and then fulfilling their own organization requirements set forth by their By-Laws. This group is also organizing some golf and tennis tournaments for all the group, and you'll be hearing more about their plans as they are finalized. We welcome them to our group, and are looking forward to making new friends from that area.

In planning the schedule, we were most anxious to provide more exhibit hall time this year, and we have been able to do that. This will give everyone more time to visit the suppliers and take advantage of the time to make some purchases or get the background for future purchases.

As far as social functions, the Wednesday barbecue has already been mentioned as one of the highlights. There also will be an entertainment night. In the village are different functions that take place during this summer season, so there will be time for you to take advantage of these things as well.

The Ladies' Program Committee is working in cooperation with the Rocky Mountain Association ladies on their program, and we have heard some of the suggestions and think the ladies will be happy with the plans.

The village itself contains Snowmass Village Mall where you will enjoy fourteen different restaurants with varying menus from gourmet to steak to homemade bread and soups—the food is delicious. One of the

Mt. Chalet	34.00	single or double occupancy, includes breakfast
Silver Tree/ El Dorado	34.00	single or double occupancy, includes breakfast
Stonebridge Inn		Full American Plan: \$ 70.00 single occupancy \$103.00 double occupancy Modified American Plan: \$55.00 single occupancy \$73.00 double occupancy

(a 15% gratuity is added at the Stonebridge Inn)

The rates at the Stonebridge Inn are substantially higher, but not without justification. The Full American Plan includes guestroom, meeting room fees, coffee break fees, full buffet breakfast, full buffet lunch, and a pre-selected dinner. The Modified American Plan includes everything mentioned above except dinner.

Condominium Rates

The Timberline Condominiums have the various accommodations and rates listed below:

Type of Unit	Maximum # of People	Rate
studios	2	\$38.00
studios w/loft	4	\$48.00
one-bedroom	2	\$49.00
one-bedroom w/loft	4	\$63.00
two-bedroom	4	\$75.00
two-bedroom w/loft	6	\$84.00
three-bedroom	6	\$90.00

The Laurelwood Condominium rate:

Type of Unit	Maximum # of People	Rate
deluxe studios	2	\$35.00
"	3	\$40.00
"	4	\$45.00

Children's Policy

Children staying in their parents' room will be charged the following:

Wildwood Inn	no additional charge under 12 years
Silver Tree/ El Dorado	" " " "
Pokolodi	" " " "
	13 years and older will be charged \$6.00 each.
Mountain Chalet	11 years and under \$3.00 12 years and older \$6.00

(the additional cost at Mountain Chalet offsets a full breakfast served family-style.)

Stonebridge Inn	
Full American Plan	\$33.00 per extra occupant
Modified American Plan	\$18.00 per extra occupant

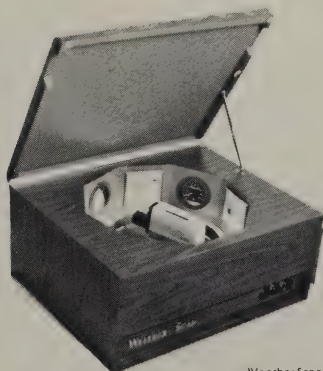
Timberline

Children under 6 years stay with their parents at no extra charge.

Laurelwood

Children are included in the rate schedule quoted.

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The Weather Scan III comes complete with Sony AVC-1400 camera with separate mesh vidicon and 2:1 interlace sync. Includes Time, Temperature, Barometric Pressure, Wind Velocity, Wind Direction, plus four card holders. Compact cabinet is just 28" wide, 23" deep and 14" high. For complete information call or write.



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restaurants is owned by John Denver, and they tell us it's nothing for him to be in and out of the village. (Incidentally, the area houses several of the stars' homes and we hear that those who inhabit the area enjoy it as their home area so they are at ease in and out of the village—trivia for you **star-gazers**).

Aside from the restaurants, the Mall houses boutiques, a beauty shop, movie theater and incidental shops. There is an activities center where information regarding the daily schedules for the summer's events—concerts, plays, and festivals—can be obtained. Complete medical and dental facilities are close-by as well.

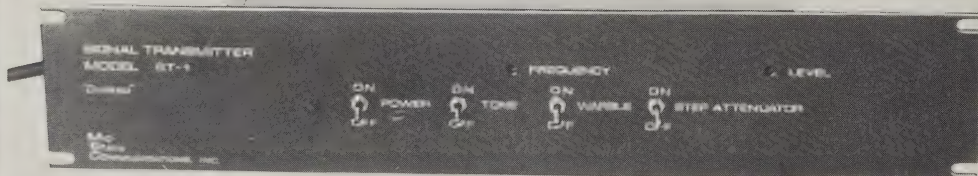
We think this will be another great CCOS—plans are full of all the things it takes to provide a meaningful session for the cable operators and techs, as well as provide a relaxing and fun time for you and your entire family.

We have included various information about Snowmass and the area, as well as information concerning the different types of accommodations available. We urge you to register as soon as possible, as these facilities have been held for our group until **May 29th** at which time the remainder will be released for public reservations. **Also, any reservation after the May 29th deadline will not get the group rate**, so it will be to your advantage to make your reservations early. Upon registering, we will confirm back to you with the proper accommodation request to the Snowmass Village Association, and they will take care of your placement from there.

If you have any questions, contact the Oklahoma City CATA office—A/C 405-947-7664. We hope that you'll be joining us in Snowmass for

CCOS-80

CATA is in the process of obtaining a **cruise to the Bahamas for our CCOS-81**. The opportunity for this '**ONCE IN A LIFETIME**' experience appealed to the CATA Board, and we have been charged with further investigation for this possibility. Detailed information will be available on the cruise in the **April** issue of the **CATA NEWSLETTER** and we will be conducting a survey to get a response on this possibility and we would appreciate your cooperation. Check your April issue of the CATA NEWSLETTER for the details on a cruise for 1981 CCOS!!!



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About Conduit

By Wayne Sheldon
Sheldon Electronics
San Jose, CA

Before you order a shipment of conduit, you should determine the material that is best for your needs. You should evaluate the many products which are available and know what you can expect from them. Since the conduit is used for the protection of and the ease of installation of your cable, it should be selected carefully. There are several factors to keep in mind when choosing it.

These include:

- Chemical stability
- Crush resistance (strength)
- Recovery from being crushed
- Impact resistance (how easy it shatters)
- Ease of pulling cable later
- Ease of handling on job site
- Availability in your area
- Ultimate total cost installed

There are several materials to consider:

- Poly pipe
- PVC pipe
- ABS pipe
- Corrugated plastic conduit
- Steel pipe
- Plastic coated corrugated steel conduit (recently made available by General Cable.)

Except for a few special occasions, all of your conduit needs will be met by one of the various plastic products which are readily available.

Polyethylene pipe (poly): This material is made from ethylene gas which is derived from petroleum by several different methods. This gas is processed under heat and pressure to make the polyethylene product. This is then mixed with coloring compound (in our case 2½% lamp black for good weathering) and extruded into pipe. The raw material can be varied in the final processing into low, medium or high density classes with no clear separation between the various types. For our use, the medium to high density is required as the low density is too soft and has a very low crush resistance. This pipe is supplied in large coils of up to several hundred feet in length. The total length depends on the size of the pipe. The standard for 1½ inch is 250 feet, but it may be available in longer lengths on special order.

Be careful when buying this material as there are two types. One is the NSF grade which must meet

pure food and drug rules and is for potable water. This material is very expensive. For conduit, use the utility grade. It is the same strength and is much cheaper. The 80 PSI rating is satisfactory for most uses. If higher crush resistance is needed, the 100 PSI rating is stronger, but costs considerably more. Some manufacturers also make a high density pipe that is designed specifically for TV duct. This is smoother inside and the cable will pull through a little easier than in regular poly pipe. This is also very expensive material.

Advantages of poly pipe:

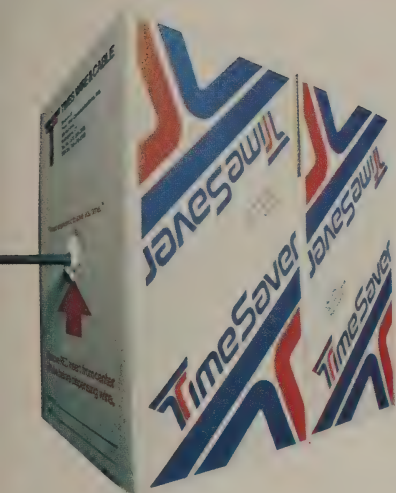
1. Long pieces, therefore few splices.
2. Fair to medium crush resistance.
3. Good recovery from crush.
4. Good chemical resistance.
5. Excellent weathering where exposed to sunlight.
6. Flexible enough that formed bends are not needed.
7. Of the suitable plastic pipes, 80 PSI utility grade is the cheapest in most areas.

Disadvantages of poly:

1. Natural coil of the conduit makes pulling cable difficult if you are not careful in laying it in the trench and seeing that it is straight.
2. Flexibility allows it to follow bottom of trench if uneven. When backfill is dumped on top it may bend, making pulling difficult. You may need a little extra labor to keep it straight.
3. Large coils are slightly harder to handle and ship.
4. Since there is no solvent for this, if waterproof splices are required, they must be mechanically. It is hard to make sure of such splices.

Polyvinylchloride (PVC): This pipe is made in various grades and weights. These range from low impact to high impact and there are several wall thicknesses for each grade. I advise that you only use the high impact type. Before purchasing, when in doubt about the type, take a short sample piece and whack it on the pavement. If it splits or breaks easily, it is not entirely satisfactory for conduit.





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Obviously the thicker the wall, the stronger (higher crush resistance) it is. This material is ordinarily supplied in 20 foot pieces, but up to 40 foot pieces are available from some manufacturers on special order.

Advantages of PVC:

1. Large variety of formulations and strengths so you can select what is best for your particular use.
2. Top of the line has the highest crush resistance of any of the plastics.
3. Stiffness such that it does not follow the unevenness of the trench. Makes pulling cable easier.
4. Easy to transport on pickup or car.
5. Simple to make positive waterproof connections.
6. Moderate to high chemical resistance.

Disadvantages of PVC:

1. High cost for thick wall material.
2. Formed bends required.
3. Short lengths require many couplings. Don't forget to include couplings with cost of pipe.
4. Poor recovery from crush.
5. Colors other than dark gray or black break down when exposed to sunlight.

ABS compounds: ABS includes a wide range of compounds which are made by mixing acrylic, butyl rubber and styrene in various ratios. At the cheap end this material has poor weathering qualities and is extremely brittle and easy to

shatter. The cheapest ABS compounds are so brittle that they are totally unsatisfactory for conduit use. At the expensive end, this is similar to PVC in weathering and shattering abilities. This material also is supplied in 20 foot lengths.

Advantages of ABS:

Except as rated regarding chemical resistance and shattering, the same as PVC.

Disadvantages of ABS:

Lowest chemical resistance of all the plastics, otherwise the same as PVC.

Note: PVC and ABS normally are extruded in different sizes so that fittings from one will not fit the other. They also require different solvents for cementing fittings.

Corrugated plastic conduit: This conduit is made from thin plastic (usually polyethylene) that is formed in radial corrugations that give it crush resistance while still maintaining flexibility. It is so flexible that this is a problem all by itself because it will follow every unevenness of the trench. If the conduit is stretched a little before backfill it helps but it is still almost impossible to pull through long lengths unless **great care** is taken to keep it straight. It is supplied in long lengths, usually 1000 feet.

Advantages of corrugated plastic:

1. Light in weight and easy to handle.
2. If you need flexibility, it's great.
3. Good weathering qualities.

Disadvantages of corrugated plastic:

1. Hard to get pull rope through.
2. Cable hard to pull.
3. Low crush resistance.
4. Difficult to get good splice.
5. Expensive to keep straight while installing.

Steel pipe: The strongest practical conduit is steel pipe followed by corrugated steel conduits.

I recommend steel pipe **only** in situations where there is **extreme danger** from being crushed or in shifting soil. For example, it would be wise to use steel pipe under a road that is constantly traveled by heavy gravel or logging trucks, especially if the soil has large rocks in it. I recommend placing a steel sleeve under large trees to prevent crushing by roots.

Caution: Do not pull cable directly in water pipe, new or used. There are sharp edges and snags inside that will cut the jacket to shreds when the cable is pulled. If you do place cable directly in steel, use electrical conduit which is smooth inside. Whenever I need steel for a short run, I use used water pipe that is large enough to slide regular plastic conduit through. (It pays to get to know your local scrap dealer.)

The corrugated steel conduit made similar to the armor that they put directly on cable. It is plastic coated and should be very durable. It is put up on large rolls similar to poly pipe.

I have never used this material, but I can foresee two problems. One: it probably will be very difficult to get it straight enough to pull cable easily. You may need a straightening device to do this. Two: the cost is very high. Therefore I can see only a

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Sales Manager

very limited use for this material, but it may be a good idea to keep a couple of rolls around for special problems.

After you have studied all the factors just mentioned you will decide what material to use under your own set of circumstances.

When pricing plastic pipe be sure to include the freight to your location in the total price. Large rolls of poly are more expensive to ship than straight pieces of PVC or ABS. Usually, however, not having to glue a joint every twenty feet or so far outweighs the difference in freight. Some manufacturers deliver on their own trucks and the delivery price is included in the total. Be sure to confirm this however.

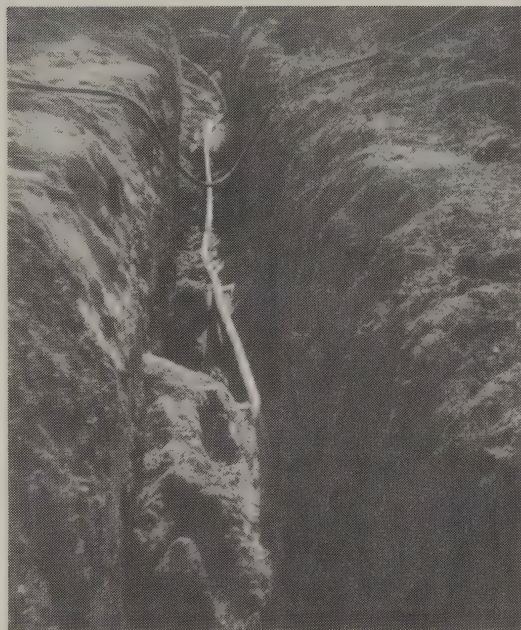
What do I use?

Taking into account the type of soil, the unusual location of our facilities and the natural hazards in our area, except for an occasional steel sleeve, I use two products. We need a conduit with good chemical stability and moderate crush resistance. Therefore for most of the installations we use 80 PSI utility grade poly of the appropriate size. Under heavily traveled roadways, we use medium wall thickness PVC. We make no attempt to keep water out of the conduit.

Now that you have the information to determine which conduit to use, we will discuss some of the ways to get it installed economically and correctly. How you approach the way your conduit is installed will make a big difference in the final cost of the job. Some of the things that work for me might be unhandy for you, and the way I approach a project is not always the only correct or easy way to do it. That which works best for you is the thing to do.

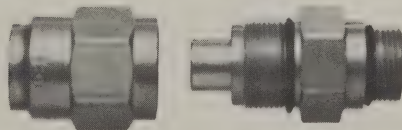
Even when digging your own trench in open country, conduit can make your job easier. One of the big advantages of installing in conduit is that you can lay it in the trench behind the trencher, cover it and make needed restoration immediately. This way you do not need to leave a trench open for a complete cable run. This avoids cave ins, people falling into the trench, kids filling it before the conduit is in, openings across driveways and similar problems. This way also eliminates a lot of hassles regarding the mess and lack of restoration. You must be sure you have a conduit in for everything you need though. It's kind of embarrassing (and expensive) to go back and dig it up because you overlooked a service drop or branch feeder that takes off 100 feet down the road. At the end of the day you can pick up and go home without worrying about an open trench. The next morning just splice another piece of conduit on and continue on as before. You need only a few barricades when you do it this way as only the last ten feet or so of your trench will be left open overnight. Many times I do not even use barricades. I just fill the whole thing and dig the end out the next day.

When you are working in areas where there are many obstacles, water pipes, phone wires, driveways, etc. conduit makes the job much easier



No!! No!! No!! you guys. That's not right. When they backfill, the conduit will be pushed down into the holes and you will not be able to pull your cable through. Now go back and smooth it out.

The with no stinger!



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Question 1

Which type of Pay-TV security is the least expensive... Positive or Negative?

The following simple formula can be used in estimating the relative costs of positive vs. negative security:

$$(BPD+H) - B(1-P)T = S$$

Where:

- B** = No. of basic subscribers
- P** = Pay penetration of basic subscribers
- D** = Unit cost of a descrambler or decoder
- H** = Cost of head-end equipment
- T** = Unit cost of Vitek's trap
- S** = Savings

Typical example using approximate values:

Where:

- B** = 1000 (1000 subscriber system)
- P** = 35.4% (national average pay-penetration according to the latest Paul Kagan Associates census-Dec. 31, 1978)
- D** = \$9.75 (approx. cost of low-band decoder)
- H** = \$500 (approx. cost of head-end equipment for low-band decoder)
- T** = \$5.00 (approx. average cost for Vitek's single-channel trap).

Using these values applied to the formula as follows:

$$(1000 \times .354\% \times 9.75 + 500) - 1000 \times .646 \times 5 = S$$
$$3951.50 - 3230 = 721.50$$

The example shows that a savings of \$721.50 would be realized in choosing Vitek's negative traps instead of the positive device. Note that more expensive decoders or descramblers would result in greater savings.

The "4" Most Important Questions You Should Ask Before Choosing Your Pay-TV Security.



Question 2

Which type of Pay-TV security is the most secure?

Pay-TV security that is outside the home and on the pole. Any picture brought into the home can be reconstituted. By using Vitek traps on the pole, this risk is eliminated. There is the added advantage, with Vitek's cable traps, of having a low-security profile.

Question 3

Which type of PAY-TV security allows for almost any number of premium channels and/or tiers of service.

Vitek's multi-channel traps gives every system operator the opportunity to market his product in almost any combination of channels and/or blocks of channels. Vitek's band-reject traps allows the system operator to trap out most of the mid-band (channels A thru G), the super-band (channels L thru W) or in a combination of both mid-band and super-band in one trap (channels A thru G plus L thru W).

Question 4

Which type of Pay-TV security has no affect on the signal-noise ratio?

Vitek's traps have absolutely no affect on the signal to noise ratio. The traps are passive and they are installed in-line only for those subscribers *not receiving* the premium channel.

Now, when you ask those 4 important questions . . . what's your answer going to be?

If you still have any unresolved questions, call or write:

Vitek Electronics, Inc.
4 Gladys Court
Edison, New Jersey 08817
(201) 287-3200
Telex: VITEK-EDIN



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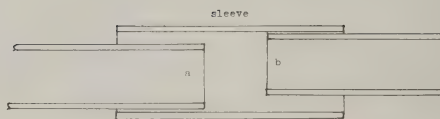


than direct bury. For example if you need to go under a water pipe it's simple to cut the conduit and splice it as needed, or to slide a piece under a tree or a paved driveway. You make your conduit runs with little regard to the number of splices. Do it the easy way, then pull the cable later.

When in joint trench, we install the conduit and then pull the cable after **all** backfilling is completed. On every project, some place, somebody forgets something or has a problem with their services. The result is that a hole is dug and often our conduit is cut or damaged. But who cares. No big deal. Splice a short piece in it and go home. If it were direct buried cable, there would be two or more splices and the worry that they will fail later. Worse yet, many small nicks are not discovered and repaired, causing future failures. The conduit will withstand normal shovel hits and abrasions, big feet, and the rocks and clods found in backfill. Often the trench is not open for a complete run before the contractor wants to fill part of it. Install the conduit in part now and splice the rest on later. You don't worry about leaving a roll of cable there for someone to drive a tractor over or steal.

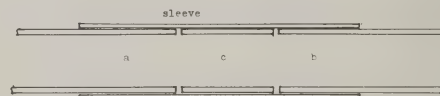
There are several precautions to take when using conduit. The main one is to keep it as straight as possible. Every little bend adds to the force required to pull cable through. You should have no more than four ninety degree bends in one continuous run. Don't forget, two 45's add up to one 90. If it is necessary to install more than four, I recommend placing a pull box in a logical place. For ease of pulling, keep all bends large. I recommend a minimum of a two foot radius on all bends for .412 and .500 cable and three for .750 cable.

One trick I use to make pulling easier is to leave the ends of the conduit uncovered. This way I can keep the ends straight while I pull the cable. Then I form the ends into the pedestals and cover the last few feet. I only do this when I can pull the cable the same day I bury the conduit. The conduit should



WRONG. For two reasons.

1. The sleeve is too large, letting the ends of the conduit (a and b) offset.
2. Even if the sleeve fit properly, the ends are not pushed together, leaving a rough spot.



RIGHT. For a repair like this the sleeve fits snug and keeps everything in line. The small piece inset in the center (c) keeps the inside smooth so that a "mouse" does not hang up when pulling a rope through. Of course you tape over the ends of the sleeve before you cover it.

always be installed in such a manner as to be able to pull the cable with everything in place.

How to splice Poly Pipe: The simple way is to use a sleeve and plastic tape. The sleeve should fit the conduit snugly so that the ends are held in line so that there is no offset in the conduit. For example, 1½ inch poly makes a good sleeve for 1¼ inch poly. Thick wall PVC usually fits the next smaller size of poly. Some manufacturers make splicing sleeves for their pipe. Simply push the ends of the conduit into the sleeve until they touch, then tape the ends of the sleeve with regular plastic tape. This is not a waterproof splice, but is adequate for most cases.

If you are on the job and do not have a special sleeve handy, take a piece of conduit about a foot long and slit it lengthways. Snap this over the joint and tape over the full length of the sleeve. It takes a little more tape this way, but it is a very good splice. This is the way I reinforce a spot that has accidentally gotten kinked. Don't cut the conduit, just straighten it and snap the reinforcement on.

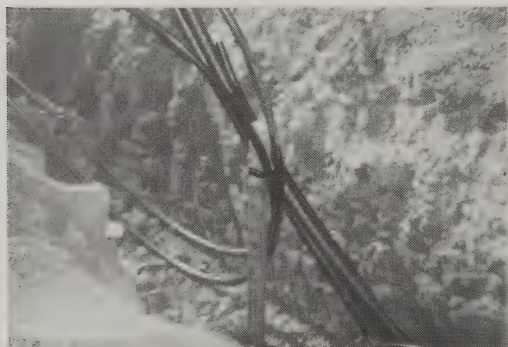
When repairing a damaged piece of conduit, cut out the damaged portion and inset a new piece of conduit. See drawings.

For splicing PVC you simply glue the fittings together.

One trick for PVC is to make your own formed sweeps. You do this by heating the pipe and forming it into the necessary shape. In the factory they use a "hot box" to heat the pipe. On the job site you don't have this luxury. The simple way is to slide the end of the pipe over the exhaust of your truck or trencher and run the engine for a few minutes until the pipe softens. With a little practice you can make nice even bends without having the pipe flatten. It helps to keep it from kinking if you stretch the pipe slightly while it hardens. If you are in a hurry, dump some cold water into it to make it harden quicker.

I hope the above information gets you started in the right direction with your conduit.

'Til next time.

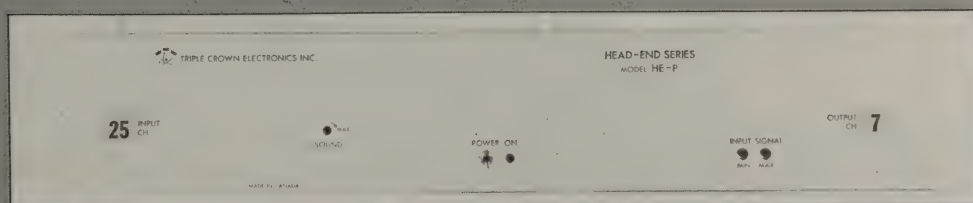


Would you expect your cables to remain in place like this for several days (in this case the trench stayed open for four weeks) without someone kinking or breaking them? If one of the conduits gets cut, kinked or damaged, it is easily repaired. The cable will be pulled in after backfill. On this job we had several conduits kinked and had six cut completely in two. Note the stake holding our conduit in the proper location.

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Anyone putting together a satellite receiving terminal wants to know just how far to go in improved performance (and cost) of its component parts, in order to be sure of **good enough** pictures and sound appearing at its output. Cost is all-important: no one wants to pay \$35,000 for a terminal that produces results indistinguishable from those of a \$5000 system. Though times are changing fast: a year ago we were wondering whether the \$10,000 barrier had been broken (for a complete terminal); in 1980 it is now possible to buy, fully assembled, the component units of such a terminal (including the antenna) for a figure below the five grand mark.

Broadly, the terminal breaks down to three expensive items: the antenna, the LNA and the receiver. Interface between receiver and standard TV is no problem. The receiver itself, if it's any good at all, will deliver the performance. In general, a more costly receiver offers better facilities rather than improved performance: you pay for options like remote control, frequency agility, LNA powering, multiple audio channels, auto polarization switching, a fashionable name on the front panel, and so on. But **any** TVRO receiver will have a good enough input noise figure, AGC range, dispersal rejection and anything that matters. The one thing

that's worth having that does vary from one receiver to another is the FM noise threshold. A standard FM discriminator may exhibit threshold at a carrier/noise ratio of 10 dB.

Diagram 1 shows how threshold is defined. Starting at high values of C/N ratio, the demodulated signal-to-noise ratio is also high—better than 50 dB, and changes with C/N on a

linear dB for dB basis. But as C/N is reduced towards threshold, signal-to-noise departs from its straight-line relation, and begins to fall off more rapidly, so that just 3 or 4 dB below the threshold the picture becomes quite unusable due to noise. The noise appearing below threshold is also of a more objectionable nature—rather than the random noise at high C/N ratios, the below-threshold noise becomes spiky and impulsive in nature, showing large white and black excursions in dark and light areas, respectively. (Hence 'sparklies'.) These speckles, while having a low RMS value, cause greater annoyance than is suggested by a video noise measurement. The point at which, as C/N is reduced, the curve of diagram 1 has departed by 1 dB from linearity, is defined as the FM noise threshold.

The advantage offered by some receivers is threshold extension. Various techniques, usually based upon a phase-locked loop, are used to shift the effective threshold to a lower value of carrier/noise ratio, typically 8 dB. And 2 dB reduc-

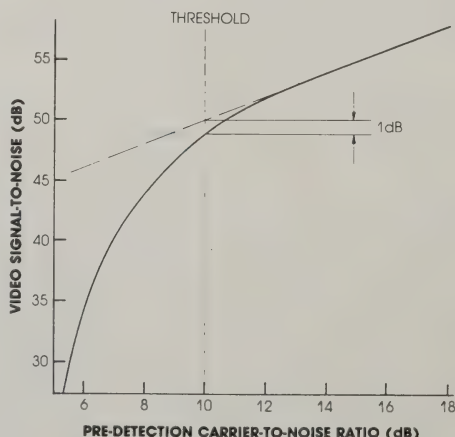


DIAGRAM 1
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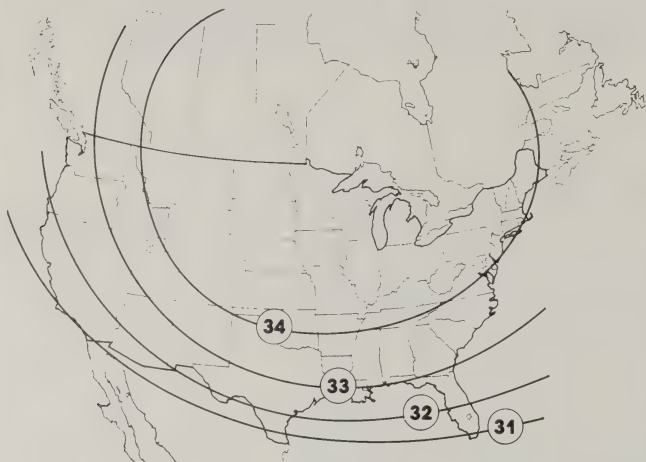
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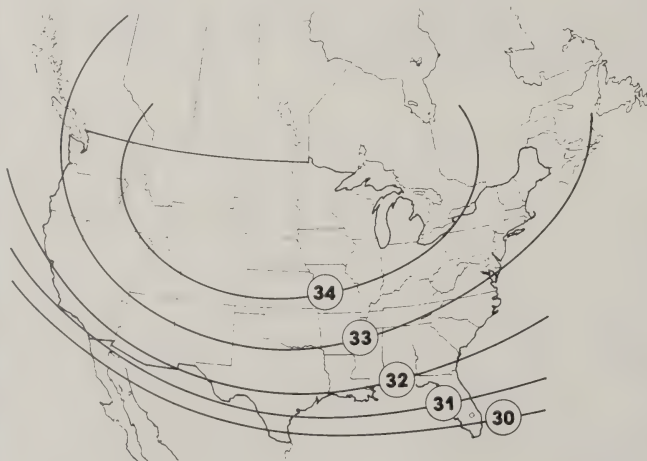
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DIAGRAM 2

**SATCOM F1 ANTENNA 1 TRANSPONDERS 2,6,10,14,18,22
POLARIZATION HORIZONTAL**

DIAGRAM 3

**SATCOM F1 ANTENNA 2 TRANSPONDERS 1,5,9,13,17,21
POLARIZATION VERTICAL**

tion in threshold is 2 dB increase in sensitivity.

At the threshold point, most receivers should deliver 45 dB or better video signal-to-noise ratio, generally adjudged as 'excellent' picture quality. (Few

broadcast viewers, and only the better-served cable TV subscribers see a better S/N ratio).

So the problem reduces to providing at the receiver input sufficient signal level to overcome noise generated within

those input circuits, and an RF carrier-to-noise ratio at least up to the receiver's threshold value. The signal level criterion is met with any reasonable combination of LNA and feed-line. Commercial LNAs start at 30 dB gain, 50 dB is a more common value, so even using RG-214 cable is acceptable so long as the run doesn't exceed a few tens of feet. Just what can suffice here is a matter of detail concerning receiver noise figure, LNA gain and feed line loss, and is so easily met that we shall not go into it in depth here.

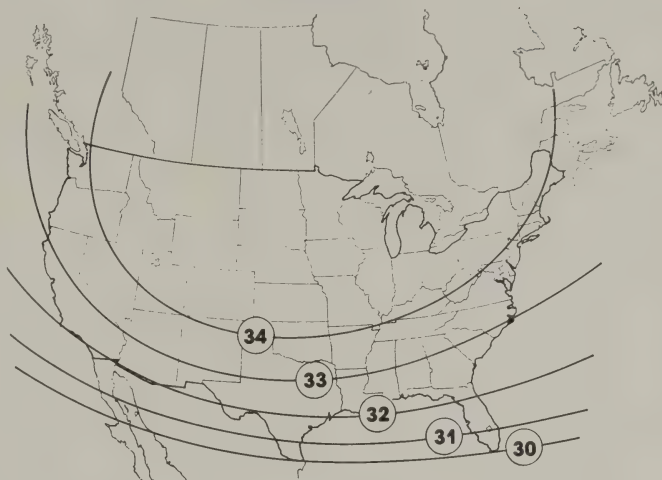
Ensuring threshold value of carrier-to-noise ratio is, however, rather more complex, though only slightly less exact. First we must look at just what we mean by carrier-to-noise ratio. It will be realized that the entire system is broadband (it responds to the full 3.7 to 4.2 GHz downlink band) up to that section of the receiver that selects the wanted channel from the other 11 (of the same polarization) presented to it. This channel selection filter, usually at the receiver's 70 MHz second intermediate frequency, defines the noise bandwidth of the receiver. It must be narrow enough to reject the adjacent channel (whose center frequency is 40 MHz away from that of the wanted channel) but wide enough to pass the full bandwidth of the wanted signal without distortion. Opinions differ on just how wide such a filter needs to be, though it is generally less than the 36 MHz allowed in the uplink and satellite multiplexers for the signal. There are noise advantages in adopting a narrower filter: whilst little of the signal is lost at the extreme edges of the channel, the total amount of wideband noise passed on to the demodulator is reduced, so increasing the C/N ratio at the demodulator. The available trade-offs were discussed in some detail in this column for December 1978, so I shall not repeat them here. Except to say that for high quality pictures, 24 MHz is considered the minimum safe

bandwidth, with the existing transmission parameters, most commercial receivers choosing 27 or 30 MHz filters. Going from a 30 MHz to a 24 MHz filter (assuming the quoted filter bandwidth is equal to its noise bandwidth—it is normally very close) gives a carrier/noise improvement of about 1 dB, so we're talking about a fairly small factor here.

So in referring to RF carrier-to-noise ratio, we really mean the C/N within a single filter bandwidth, rather than a wide-band measurement. (Carrier-to-noise ratio can be measured after the i.f. filter, as described in CATJ September 1979).

What is there left to juggle with? The antenna and the LNA, that's what! We're stuck with the bird's EIRP towards our location, so it is necessary to decide what combination of antenna and LNA is needed, in conjunction

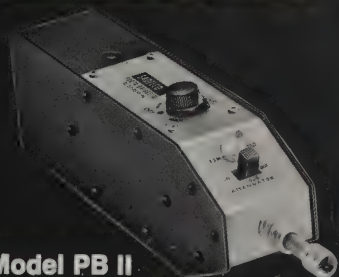
DIAGRAM 4



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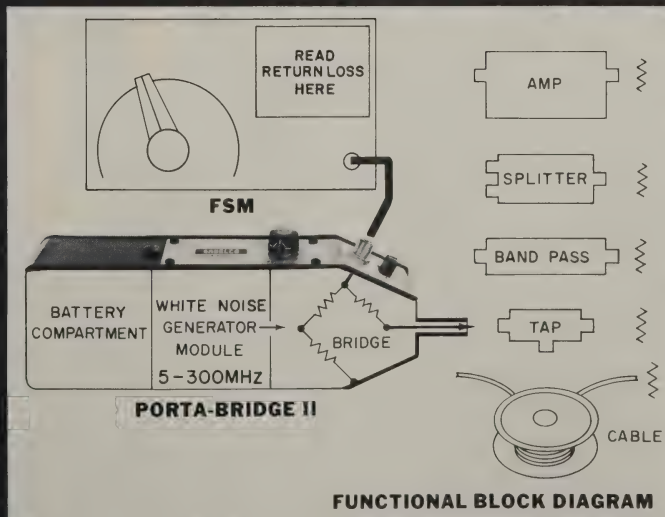
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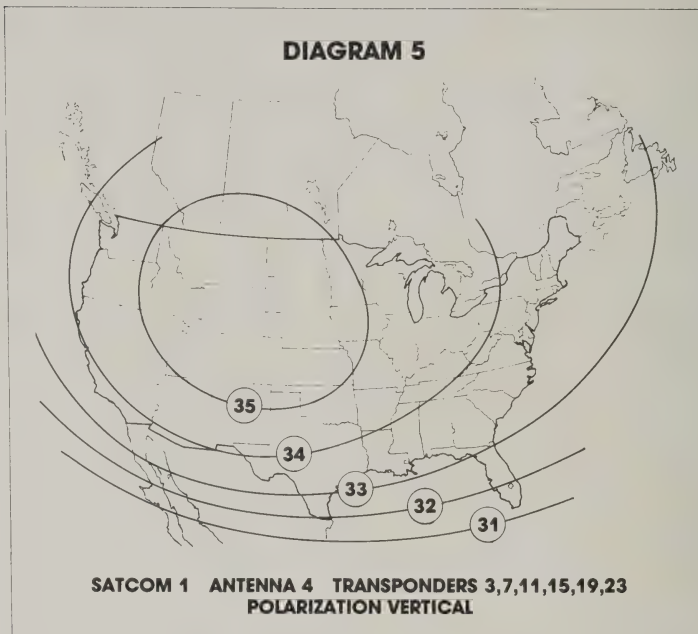
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with that EIRP to give us our 10 dB/30 MHz (or whatever) C/N.

For the most popular RCA Satcom F1 bird, we are fortunate in having a set of recent and independently measured EIRP footprints—we know this bird's EIRP more accurately than most. EIRP contours derived from these measurements are shown in diagrams 2 to 5. Each of the four transmitting antennas on the satellite has a slightly different coverage, and each is fed from a group of six of the 24 transponders. Including satellite beam-pointing errors, the values indicated by these contours should be accurate to within 1 dB. The EIRP figure of course takes into account transponder TWT output power, waveguide and multiplexing losses and antenna gains on the satellite, but can of course (in this form) only be an average over the six transponders in a group. Nevertheless, we believe the total error should not exceed 1 dB, for any particular transponder.

Now in order to know what carrier to noise power ratio to expect from a particular combination, we must work out, separately, the carrier (signal) power and the noise power, at a suitable reference point in the system. Since the LNA will be specified in terms of equivalent noise temperature at its input port (socket or flange) this is taken as the reference point.



Looking at the factors that make up the noise power contribution of our receive terminal, the most significant is that of the LNA. The noise temperature equivalence is given to avoid considerations of bandwidth entering the LNA spec. Knowing our receiver noise bandwidth, the conversion can be made (to power) by multiplying the noise temperature by that bandwidth, and by Boltzmann's constant k :

$$P_N = kTB$$

But it is convenient to translate all noise sources to an equivalent temperature before this conversion. The temperature terms then just need to be added before insertion in the above formula.

So to the LNA noise temperature we must add

1. The receiver and LNA-receiver cable contribution. (This is negligibly small in practice, as described above).
2. The 4 GHz feed-line between antenna and LNA. Again negligibly small, since the antenna feed-horn typically bolts direct to the LNA flange.

(These two values you may think should be in the signal calculation rather than the noise one. But in fact, being attenuations, they also contribute their own noise, so they work against us in both sides of the equation).

3. The antenna noise temperature. Since antenna surfaces are normally solid metal of high conductivity, the antenna's noise is principally

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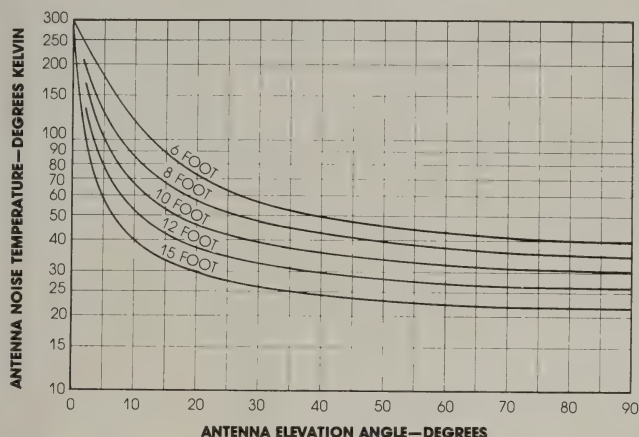
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DIAGRAM 6

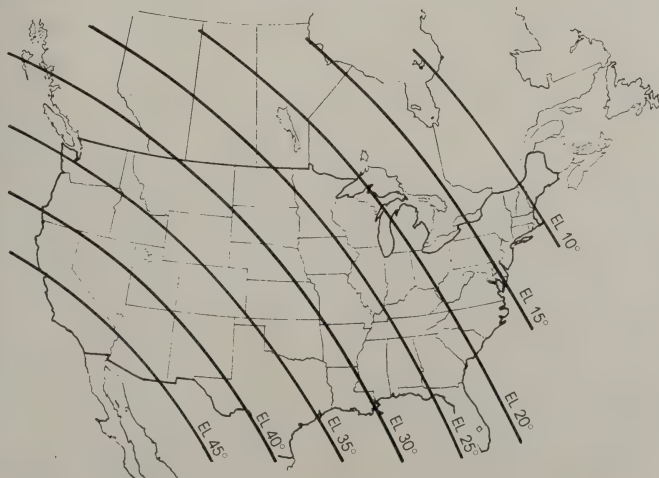


TYPICAL VARIATION OF ANTENNA NOISE TEMPERATURE WITH ELEVATION ANGLE, FOR 5 POPULAR ANTENNA SIZES

that noise from the surroundings which enters the antenna beam and its side-lobes. The surroundings in question means in practice thermal radiation from the earth itself, or any other objects at ambient temperature (buildings, trees, people, etc.) that the antenna

sees. Diagram 6 shows how (typically) antenna noise temperature varies with elevation angle and antenna size, when located on flat ground with no obstacles. At low elevation angles, the rise in temperature is due to the antenna's main lobe beginning to see the ground. So

DIAGRAM 7



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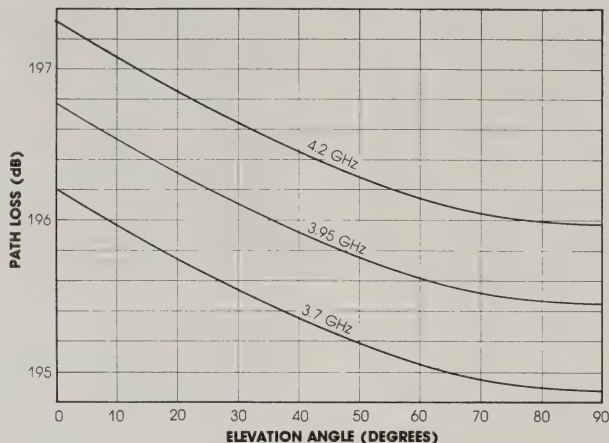
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DIAGRAM 8



PATH LOSS FROM GEOSTATIONARY ORBIT, IN TERMS OF ELEVATION ANGLE AND FREQUENCY

with the lower gain antennas, it rises quite steadily. With high gain a lower elevation can be used before the ground is seen, at which point the rise is more steep. For high elevation angles, antenna noise is determined by the 'clean-ness' of the sidelobe pattern, so again is higher for a smaller dish. The antenna's feed-horn illumination profile affects the side-lobe level, and has to be adjusted for a compromise between forward gain and pattern purity. This adjustment is performed at the antenna design stage and cannot be changed (except by substituting another feed-horn) unless a variable beamwidth feed is used such as the hybrid-mode scalar horn I described in this column in February 1979.

The curves shown relate to average paraboloid antennas, prime-focus fed. A spherical-surface antenna will exhibit a somewhat higher noise temperature, and a horn of similar aperture will be lower in noise.

4. Any discrete noise sources intercepted by the beam will

add to the antenna noise temperature. This includes stellar and galactic radio sources, an the sun, should that line up with the wanted satellite (CATJ November 1979). Such conjunctions are transient phenomena, so will not be considered here.

5. Atmospheric water vapor is both an attenuator and a noise source. However at 4 GHz, and at temperate latitudes, its effect is slight, seldom amounting to as much as 1 dB in both effects combined, except in heavy rainstorm conditions with thick cloud.

So for all practical purposes our noise equation includes a noise temperature term made up of LNA plus antenna noise. Plotting elevation contours for the wanted satellite (diagram 7) lets us see at a glance the elevation angle corresponding to our location. Reading off our antenna size opposite this elevation angle (diagram 6, or antenna manufacturer's diagram if available) gives the antenna noise temperature to be expected. Call this T_{ANT} . If selecting components for a system, LNA noise temperature will as

yet be undecided. (This assumes we start by specifying the antenna. There may be some virtue in specifying the LNA first. For the small terminal this is the more expensive item. Below about 120°K, LNA cost and lead time increase dramatically, so it could be more flexible to choose an antenna to suit the LNA). We shall refer to this figure as T_{LNA} .

So the 'T' to convert to noise power is ($T_{ANT} + T_{LNA}$).

It is convenient to express our signal and noise powers as dB power ratio relative to one watt, or dBW. We arrive at this figure directly if we convert the other terms in the $P_N = kTB$ formula to dB.

Boltzmann's constant is
-228.6 dB/°K-Hz

Temperature is
 $10 \log (T_{ANT} + T_{LNA}) \text{ dB}^\circ\text{K}$
e.g. 150°K = 21.76 dB°K

Bandwidth is
 $10 \log B \text{ (Hz)}$ in units of dB Hz
e.g. 30MHz = 74.77 dB Hz

And of course the terms now being logarithmic, we add instead of multiply. For the 150°K, 30 MHz example, this gives

$$-228.6 + 21.76 + 74.77 = -132.07 \text{ dBW}$$

This is total noise power at the LNA input reference point, so now we calculate the signal power.

Knowing the EIRP value leaving the satellite in our direction (Diagrams 2 to 5), we must subtract the path loss between satellite and our antenna, and add the gain of our antenna, to arrive at signal input to our LNA.

Path loss is made up of two components: the attenuation referred to in the noise calculation, which we are neglecting, and the 'spreading loss' resulting from the free-space propagation between satellite and earth. This is dependent on distance and wavelength (d and λ), according to:

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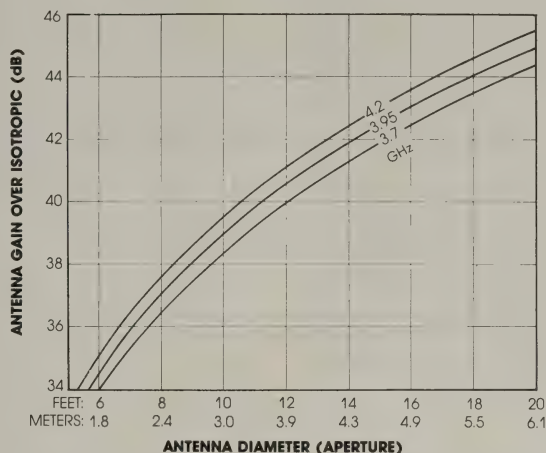
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DIAGRAM 9



$$L = \left(\frac{4\pi d}{\lambda} \right)^2$$

Diagram 8 plots this as a function of frequency and elevation angle—the nearer the terminal to the sub-satellite point, the higher its elevation angle and the shorter its path length: path length is longer at low elevation angles to the tune of more than 1 dB. So the northeastern states pay a double penalty with their low elevation angle—a higher antenna noise and a higher path loss. We must take the worst-case value to specify our system (unlikely we want only the low-end transponders), so read off 4.2 GHz path loss opposite elevation angle derived from diagram 7. This we shall call L, expressed in dB.

Antenna gain depends upon aperture, wavelength and illumination efficiency, according to

$G = \pi^2 \eta \left(\frac{D}{\lambda} \right)^2$, where D is the diameter of the aperture in the same units as λ .

Assuming a typical efficiency of 50%, this is plotted in diagram 9. Here the high-frequency end of the band has the advantage, offsetting the propagation difference. Still, to be sure of adequate margin it is wise to take again the worst case, so read off 3.7 GHz gain opposite the projected antenna aperture.

(Taking mid-band values of path loss and antenna gain would yield a system requirement about 1 dB less exacting (less costly), at the risk of being just below, rather than just above, threshold.)

We can now calculate signal power presented to the LNA input, as

$$P_C = \text{EIRP} - L + G$$

(all expressed in dB)

For a 15 ft. antenna and a 40 degree elevation angle this would give (take worst transponder set EIRP, say 34 dBW)

$$P_C = 34 - 196.5 + 42 = -120.5 \text{ dBW}$$

So this is all we need to establish C/N. Since $P_N = -132.07 \text{ dBW}$,

$$C/N = P_C - P_N \text{ (both in dB)} = -120.5 - (-132.07)$$

= 11.57 dB, a margin of 1.57 dB above a standard receiver's 10 dB threshold, or 3.57 dB above an 8 dB extended threshold. The process of specifying TVRO component performance comes down to inserting one's own parameters and those of the available (and affordable) equipment into the above formulae, in place of the examples given.



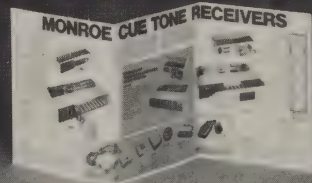
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- Monitors 4 program channels
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- 4 co-axial SPDT switches for base band video or IF switching
- Isolation in excess of 80 db at 4.5 MHz
60 db at 41.25 MHz



See Monroe 6-page brochure

Satellite Cue Tone Signaling Products

Also ask for data on Emergency Access Units 3000R7-R71-R72. They provide for dial up access to cable audio for emergencies.

NEW DEVELOPMENT AGILE RECEIVER CONTROLLER 3000R-82


for dial-up telephone remote control of most brands of frequency agile receivers. Permits selection of channel and polarization by telephone call. Phone Monroe for all your tone signaling needs:

Northern CATV Representatives:
800-448-1655
Monroe Electronics Factory:
716-765-2254



MONROE ELECTRONICS, INC.

100 Housel Avenue
Lyndonville, NY 14098



Satellite Technology News

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Short Term Objectives of the Plan

- Replace a portion of SATCOM III capacity by leasing from another carrier.
- Purpose
 - Not a legal requirement
 - Not for immediate profit
 - Voluntary action undertaken to provide a service in great demand
 - Encourage and expedite the growth of satellite service to the cable industry

AT&T AGREEMENT

- Service available only because of emergency situation
- Up to 11 preemptible transponders
- One year term with month-by-month extension to December 31, 1981
- RCA must specify the number of transponders and starting dates by March 7
- Lease rate to RCA is \$70,000 per month

AT&T AGREEMENT

KEY TECHNICAL PROVISIONS

- Service on Comstar D-1; 95° west longitude
- Service is preemptible
- Service is interruptible
 - Sun outage protection
 - Occasional scheduled maintenance
- RCA responsible for assuring immediate availability for preemption or interruption
- Polarization
 - Rotated 20° with respect to Satcom
 - Uplinks and downlinks on same polarization
 - 7 vertically, 4 horizontally polarized transponders available
- Footprint covers conus and lower portion of Alaska

Assignment of AT&T Transponders

- All eleven transponders to be assigned to Cable TV Service
 - Will form a second cable network, CATV-2
- Expect CATV-2 to grow rapidly
 - Concept of satellite distribution is proven
 - Deregulation of receive-only earth stations
 - Capacity of earth station manufacturers

AT&T Transponders—Service Protection

- AT&T preemptibility conditions to RCA flow through to RCA customers.

AT&T Transponders—Tariff

- AT&T transponders to be leased in accordance with 5-year preemptible tariff rate.

Needless to say, the last two months have been difficult ones for RCA's Americom management. The loss of SATCOM III has presented a host of very complex problems—technical, regulatory, and commercial. Beyond these problems has been an overriding concern for those who were depending on SATCOM III capacity to initiate or expand their business. RCA has spent a major part of their time addressing these problems in an effort to create a solution for them. The expansion of service to the cable TV industry was the **most** seriously affected by the SATCOM III loss, so it has been necessary for RCA to develop a plan to minimize the short term impact and provide for a long term plan for growth.

RCA's plan will go beyond the interim provision for the next year and a half while the replacement for SATCOM III is being constructed and launched. This plan has kept the special needs of the cable industry in mind and demonstrates their intention of continuing to provide service for satellite distribution.

Because of the complexity of the material, we will present their objectives and plan in outline form so that it will be easier for you to digest.

In the three-satellite system which includes AT&T, Cable Net-1 will continue on SATCOM I and Cable Net-2 will be established on the COMSTAR D-2 satellite. Following the brief transition period after SATCOM III is launched, the 4-satellite system as shown would be established.

Note that it is shown that the orbital spare would be located at 136 degrees. This is outside the so-called prime orbital arc, but it would provide satisfactory coverage for all the RCA services and thus SATCOM I can provide protection for satellites at all the other orbital slots.

You will note that SATCOM IV is located at 83°. You may be aware that Western Union has just filed an application with the FCC in which it requested authority to launch its shared spare NASA-preemptible TDRS satellite in this same orbital slot.

The study of this application has not been completed, but it is assumed that suitable alternatives exist which would fulfill the legitimate requirements of both and thus avoid a conflict. RCA will be filing with the FCC in the near future, proceeding on the assumption that SATCOM IV will be launched on schedule.

Above is the schedule for switching back to the SATCOM III replacement late in 1981, but the major issue remains the assignment of the two transponders available on Cable Net-1. RCA tells us that they will poll the Cable Net-2 customers after the first of next year to determine which would desire one of the two available transponders on Cable Net-1. Some may wish to remain on Cable Net-2, but it is estimated that there will be a big demand on Cable Net-1 and the customers will be selected by lottery by an independent accounting firm or other qualified organization.

When SATCOM IV becomes operational, all CATV transponders will become protected. SATCOM I and SATCOM II will then be near the end of their life, and the ability to provide protection on all transponders may be limited by the transponders that fail on these two. Replacements for these are scheduled for launch in late 1982 and early 1983. But, during the interim, the number of protected transponders may be slightly less, but aside from this, the new service protection policy would become effective.

In summary, RCA will absorb considerable out-of-pocket expenses on leased transponder capacity so that Cable Net-2 can start almost immediately, knowing that one satellite is totally inadequate to handle the requirements, and the sooner Cable Net-2 gets underway, the better.

True, it was a tremendous setback realized as a result of the loss of SATCOM III, but it is temporary, and all the above indicates the efforts on the part of RCA to complete its commitment to the industry for extended satellite services.

Long Range Facility Plans

Satellite Schedule

	Planned Dates	
	Launch	In Service
SATCOM III (replacement)	6/81	10/81
SATCOM IV	10/81	2/82

Service Restoration Policy

- Current policy
 - Preemptible transponders distributed among active satellites.
 - Three service grades; protected, unprotected, and preemptible.
 - Preemptible transponders leased on long term contracts.
- Problems
 - Cannot protect all CATV transponders
 - Interruption of long term preemptible traffic would be a serious problem even though permitted by tariff.
- New policy (effective upon operation of SATCOM IV)
 - Preemptible transponders concentrated on a single satellite—an in-orbit spare.
 - Minimum of one spare transponder for each six active transponders.
 - Two preemptible transponders on each satellite.
 - Ground spare
 - Two service grades—protected and preemptible (no difference in cost of protected and unprotected service)
 - Preemptible transponders leased only for short term or occasional service
- Transponder configuration

	Protected	Preemptible
Operational satellites	22	2
In-orbit spare	2	22

- Limits CATV-1 to 22 transponders

Transponder Availability

Cable Nets—1 and 2

	Current		3 Satellites		Interim SATCOM III				4 Satellites	
	1	2	W.	AT&T	1	2	1	2	1	2
Protected	5	-	5	-	11	2	22(1)	9	-	-
Unprotected	10	-	10	-	11	1	-	-	-	-
Preemptible	5	-	5	11	-	6	-	-	-	-

(1) 18 protected and 4 unprotected until SATCOM I replacement becomes operational—1st Quarter 1983.

Orbital Locations

3-Satellite System with AT&T

SATCOM I	SATCOM II	COMSTAR D-2
136°	119°	95°
Cable Net-1		Cable Net-2

4-Satellite System

SATCOM I	SATCOM III	SATCOM II	SATCOM IV
136°	132°	119°	83°
Orbital Spare	Cable Net-1		Cable Net-2

Transition Policies

AT&T to SATCOM III Replacement

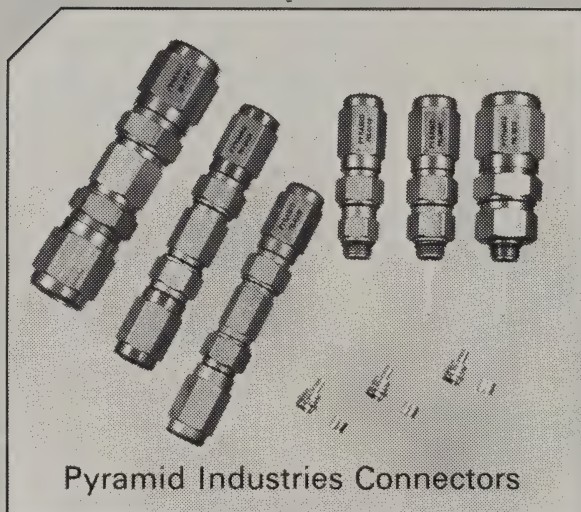
Transponder Assignment Policy—

- Approximately January 1, 1981, CATV-2 customers will be polled to determine which ones would desire one of the two available transponders on CATV-1.
- If there is demand for more than the two, customers will be selected by lot.

SATCOM IV Transition

- All CATV transponders (22 on CATV-1 and 9 on CATV-2) become protected*
 - New service protection policy becomes effective
- *except as previously noted

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ASSOCIATE SHOWCASE

JERROLD MEETS 400 MHz FFT TAP PRODUCT AVAILABILITY COMMITMENT

Jerrold announced today that 400 MHz Series FFT Taps are available for immediate shipment.

On November 12, 1979 Jerrold formally announced System 400, a 52 channel cable system, an industry first and a significant technological breakthrough. At that time, Jerrold defined a program for the production of the various components required to construct a complete 400 MHz system. The FFT Taps were the first components to be available and scheduled for February delivery.

The new Series FFT 400 MHz Taps provide the widest range of values, low insertion loss and excellent RF integrity. The corrosion resistant, weather proof devices have interchangeable base plates.

Mr. John P. Forde, Jerrold's Vice President of Sales, stated that, "Jerrold is confident it will continue to meet its commitments for other System 400 components. The industry reaction to System 400 has been excellent and particularly as it relates to its compatibility with existing systems and our customer's future plans."

General Instrument Corporation through the Jerrold Division, is a leading international manufacturer and supplier of electronic systems and components, including on-line wagering and electronic point-of-sale systems, cable TV products, integrated circuits, discrete semiconductors and optoelectric devices, mercury-wetted reed relays and other components for the telecommunications and computer industries, miniature lamps and displays, TV components, and automotive electronics. For more information, contact Sam Compton at Jerrold, 2200 Byberry Road, Hatboro, Pa. 19040 or call 215-674-4800.

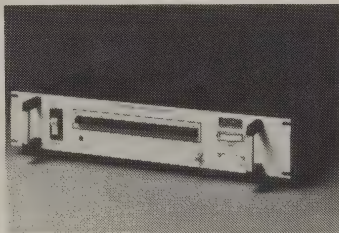
LOW-COST SATELLITE RECEPTION PROVIDED IN NEW HUGHES SYSTEM

A new satellite receiving system, designed to provide low-cost channel expansion of CATV systems and compatible with existing earth station receiving equipment, has been introduced by Hughes Aircraft Company's microwave communications products.

The receiving system consists of separate downconverter and receiver

modules. The downconverter, Model IDC-472, converts the entire 3.7-4.2 GHz band to 0.95-1.45 GHz for input into the receiver. Significant cost savings can be obtained by connecting up to 12 agile receivers to a single downconverter on either horizontal or vertical polarization.

The 24-channel receiver, Model SVR-463, provides means for push-button channel selection, conversion to a second intermediate frequency, automatic gain control, demodulation and video/sound processing. Utilizing state-of-the-art microwave integrated circuitry for high reliability, the receiver is an outgrowth of receiver-development work performed by Hughes for NASA.



Additional standard features of the receiver include threshold extension, remote tuning capability, and built-in test/alignment circuitry. An AGC output terminal aids in locating and aligning the antenna to the satellite.

The receiving system, when combined with an antenna, low-noise amplifier, and integration electronics constitutes a complete satellite video receive terminal.

For more information, contact Hughes Microwave Communications Products, Box 2990, Torrance, Ca. 90509.

SCIENTIFIC ATLANTA INTRODUCES NEW EQUIPMENT ITEMS

Scientific-Atlanta, Inc., has introduced a new line of 400 MHz cable television equipment to provide 54 channel capacity and two-way capability through a single distribution cable. The new family of products will be used for new cable television systems and for modernizing existing systems at a significant cost savings over the addition of duplicate equipment.

The Atlanta-based communications and instrumentation firm now can serve as a single source of supply for a 400 MHz cable television system. Products offered include distribution amplifiers, taps and passives, 54-channel set-top terminals and headend electronics. The demand for expanded bandwidth, greater channel capacity and two-way communications has come about by the public acceptance of the greatly expanded television programming now available via satellite.

The 400 MHz line of products has resulted from Scientific-Atlanta's accelerated product development program to serve the cable television industry. The new line provides the cable operator higher-frequency equipment needed to pick up the signal at the satellite earth station, distributing it along the cable and converting it for the subscriber's television set.

Scientific-Atlanta, Inc., has also introduced the Model 8006 three meter satellite earth station antenna which offers excellent performance and maximum cost effectiveness for data, audio and video receive-only applications. The three meter diameter antenna consists of compact components that can be economically transported and assembled. Special handling equipment is not required for installation at remote sites and on roof tops.

The single axis mount provides structural rigidity and simple point adjustment. The antenna can be pointed with a single adjustment to any two satellites in the 90° to 136° arc with zero pointing error. Similar pointing adjustments can be made in the 70°-90° arc by a single strut change. A pier foundation mounting kit which minimizes installation costs is available from Scientific-Atlanta.

The three meter earth station is manufactured by high volume production techniques to provide a quality, cost effective product. The reflector is made up of interchangeable, precision die-stamped panels. Special tools, panel alignment, and testing are not required to achieve optimum performance.

The Atlanta-based firm has introduced its Series 6700 set-top terminal, a 54 channel converter designed to meet the needs of cable

Continued on page 56.

ASSOCIATE ROSTER

AmeriCom Satellite Network, Inc., (A.S.N.), 310-14th Ave. South, St. Petersburg, FL 33701 (S4) 813-895-4201
 Anixter-Pruzan, Inc., P.O. Box 88758, Tukwila Branch, Seattle, WA 98188 (D1) 206-251-6760
 The Associated Press, 50 Rockefeller Plaza, New York, NY 10020 (S9 Automated News SVC) 212-262-4014
 AvanteK, Inc., 3175 Bowers Avenue, Santa Clara, CA 95051 (M8) 408-249-0700
 Bankers Trust Company, 280 Park Ave., New York, N.Y. 10017 (S3, S9) 212-692-2430
 Belden Corp., Electronic Division, P.O. Box 1327, Richmond, IN 47374 (M3) 317-966-6661
 B E I (BESTON ELECTRONICS, INC.), P.O. Box 106A, Olathe, KS 66061 (M9 Character Generators) 913-764-1900
 Bethlehem Tower Works, P.O. Box #68, Harrison, Ark. 72601 (M9) 501-741-9031
 BLONDER-TONGUE LABORATORIES, One Jake Brown Rd., Old Bridge, N.J. 08857 (M1, M2, M4, M5, M6, M7) 201-679-4000
 BROADBAND ENGINEERING, INC., 1525 Cypress Dr., Jupiter, FL 33458 (D9, replacement parts) 1-800-327-6690
 Budco, Incorporated, P.O. Box 4593, Tulsa, OK 74120 (D9 Security & Identification devices) 918-584-1115
 Cable TV Supply Company, 11505 West Jefferson Blvd., Culver City, CA 90230 (D1, D2, D3, D4, D5, D6, D7, D8, M5, M6) 213-390-8002
 CCS HATFIELD/CATV DIV., 5707 W. Buckeye Rd., Phoenix, AZ 85063 (M3) 201-272-3850
 C-COR ELECTRONICS, INC., 60 Decibel Rd., State College, PA 16801 (M1, M4, M5, S1, S2, S8) 814-238-2461
 Century III Electronics, Inc., 3880 E. Eagle Drive, Anaheim, CA 92807 (M1, M3, M4, M5, M7, M8, S1, S2, S8) 630-3714
 Cerro Communication Products, Halls Mill Rd., Freehold, N.J. 07728 (M1, M3, M4, M5) 201-462-8700
 Channel Master, Div. of Avnet, Inc., Ellenville, N.Y. 12428 (M2, 3, 4, 5, 6, 7) 914-647-5000
 COLLINS COMMERCIAL TELECOMMUNICATIONS, MP-402-101, Dallas, TX 75207 (M9, Microwave) 214-690-5954
 COMMSCOPE COMPANY, Rt. 1, Box 199A, Catawba, NC 28609 (M3) 704-241-3142
 COMMUNICATIONS EQUITY ASSOCIATES, 651 Lincoln Center, 5401 W. Kennedy Blvd., Tampa, FL 33609 (S3) 813-877-8844
 Compucon, P.O. Box 401229, Dallas, Tx. 75240 (S8) 214-233-4380
 COMPUTER VIDEO SYSTEMS, INC., Suite 7, 3575 So. West Temple, Salt Lake City, UT 84115 (M9) 801-262-3013
 Comsearch, Inc., 2936 Chain Bridge Rd., Oakton, VA 22124 (S8, S9 earth station placement frequency coordination) 703-281-5550
 ComSonics, Inc., P.O. Box 1106, Harrisonburg, VA 22801 (M8, M9, S8, S9) 703-434-5965
 Continental Lift Corp., RR 2, Box 9, Austin, Minn. 55912 507-433-7387
 CRC ELECTRONICS, INC., 2669 Kilihaui St., Honolulu, HI 96819 (M9 Videolape Automation Equipment) 808-668-1227
 CWY Electronics, 405 N. Earl Ave., Lafayette, Ind. 47904 (M9, D1) 317-447-4617
 Daniels & Associates, 2930 E. 3rd Ave., Denver, Colo. 80206 (S3, S9 Brokerage) 303-321-7550
 DAVCO, INC., P.O. Box 861, Batesville, AR 72501 (D1, S1, S2, S8) 501-793-3816
 DF Countryman Co., 1821 University Ave., St. Paul, MN 55104 (D1, S1, S8) 612-645-9153
 Durnell Engineering, Inc., Hwy. 4 So., Emmetsburg, Iowa 50536 (M9) 712-852-2611
 EAGLE COM-TRONICS, INC., P.O. Box 93, Phoenix, NY 13135 (M9 Pay TV Delivery Systems & Products) 315-695-5406
 EALES COMM. & ANTENNA SERV., 2904 N.W. 23rd, Oklahoma City, OK 73107 (D1, 2, 3, 4, 5, 6, 7, S1, 2, S7, 8) 405-946-3788
 Entertainment and Sports Programming Network, 319 Cooke St., Plainville, CN 06062 (S9) 203-747-6847
 FARINON ELECTRIC, 1691 Bayport, San Carlos, CA 94070 (M9, S9) 415-592-4120
 FERGUSON COMMUNICATIONS CORP., P.O. Drawer 871, Henderson, TX 75652 (S1, S2, S7, S8, S9) 214-854-2405
 Gardiner Communications Corp., 1980 S. Post Oak Rd., Suite 2040, Houston, TX 77056 (M9 TVRO Packages, S1, S2, S8) 713-961-7348
 General Cable Corp., 1 Woodbridge Center, P.O. Box 700, Woodbridge, N.J. 07095 (M3) 201-636-5500
 GILBERT ENGINEERING CO., P.O. Box 14149, Phoenix, AZ 85063 (M7) 602-272-6871
 GTE Sylvania, P.O. Box 239, Lilburn, Ga. 30247
 Harris Satellite Comm. Antenna Operations Division, P.O. Box 1277, Kilgore, TX 75662 (M2, M9, S2) 214-984-0555
 Heller-Oak Communications Finance Corp., 105 W. Adams St., Chicago, IL 60603 (S3) 312-621-7661
 HOME BOX OFFICE, INC., 7839 Churchill Way—Suite 133, Box 63, Dallas, TX 75251 (S4) 214-387-8557
 HUGHES MICROWAVE COMMUNICATIONS PRODUCTS, 3060 W. Lomita Blvd., Torrance, CA 90505 (M9) 213-534-2146
 IBM Corp., P.O. Box 2150, Atlanta, GA 30301 404-231-6005
 JERROLD Electronics Corp., P.O. Box 487, Byberry Rd. & PA Turnpike, Hatboro, PA 19040 (M1, M2, M4, M5, M6, M7, D3, D8, S1, S2, S3, S8) 215-674-4800
 JERRY CONN ASSOCIATES, INC., P.O. Box 444, Chambersburg, PA 17201 (D3, D4, D5, D6, D7, D8) 717-263-8258
 Katek, Inc., 134 Wood Ave., Middlesex, NJ 08846 201-356-8940
 Klungness Electronic Supply, P.O. Box 547, 107 Kent Street, Iron Mountain, MI 49801 (D1, D8, S2, S8) 906-774-1755
 LARSON ELECTRONICS, 311 S. Locust St., Denton, TX 76201 (M9 Standby Power) 817-387-0002
 LRC Electronics, Inc., 901 South Ave., Horseheads, N.Y. 14845 (M7) 607-739-3844
 Magnavox CATV Division, 133 West Seneca St., Manlius, N.Y. 13104 (M1) 315-682-9105
 MCE CORP., P.O. Box 1341, 2629 N. 24th Dr., Phoenix, Ariz. 85002 (M4, M9) 602-271-9181
 MetroData Corp., 2150 North 107th, Suite 420, Seattle, Wa. 98133 (M9) 206-367-2100
 MICRODYNE CORPORATION, 471 Oak Road, Ocala, FL 32672 (M9 Satellite TV Receivers) 904-687-4633
 MICROWAVE ASSOCIATES, INC., 777 S. Central Expwy., Suite 4-C, Richardson, TX 75080 (M9 Microwave Radio Systems) 816-891-8895
 Microwave Filter Co., 6743 Kinne St., Box 103, E. Syracuse, N.Y. 10357 (M5 Bandpass Filters) 315-437-4529

MID STATE Communication, Inc., P.O. Box 203, Beech Grove, IN 46107 **(M8)** 317-787-9426
 Midwest Corp. CATV, Divn., P.O. Box 226, Clarksburg, W. Va. 26301 **(D1,2,3,4,5,6,7,8)** 304-624-5459
 Modern Cable Programs Division of Modern Talking Picture Service, Inc., 2323 New Hyde Park Road, New Hyde Park, NY 11042 **(S4)** 516-437-6300
MSI TELEVISION, 4788 South State St., Salt Lake City, UT 84107 **(M9 Digital Video Equip.)** 801-262-8475
 National Screen Service Corp., 1600 Broadway, New York, NY 10019 **(M9)** 212-246-5700
 Northern CATV Sales, Inc., 115 Twin Oaks Dr., Syracuse, NY 13206 **(D1)** 315-463-8433
OAK INDUSTRIES INC./CATV DIV., Crystal Lake, IL 60014 **(M1, M9 Converters, S3)** 815-459-5000
PRODELIN, INC., 1350 Duane Avenue, Santa Clara, CA 95050 **(M2, M3, M7, S2)** 408-244-4720
Q-BIT Corporation, P.O. Box 2208, Melbourne, FL 32901 **(M4)** 305-727-1838
Reuters, 1212 Avenue of the Americas, 16th Floor, New York, N.Y. 10036 **(D9)** 212-730-2715
RMS CATV Division, 50 Antin Place, Bronx, NY 10462 **(M5, M7)** 212-892-1000
Sadelco, Inc., 299 Park Avenue, Weehawken, NJ 07087 **(M8)** 201-866-0912
SATCO, P.O. Box 1260, Lewisville, TX 75067 **(M4)** 214-436-9509
Scientific Atlanta Inc., 3845 Pleasantdale Rd., Atlanta, GA 30340 **(M1, M2, M4, M8, S1, S2, S3, S8)** 404-449-2000
SCIENTIFIC COMMUNICATIONS, INC., 3425 Kingsley Rd., Garland, TX 75041 **(M4 Low Noise & Parametric)** 214-271-3685
Sherman and Brown Associates, P.O. Box 4475, Ft. Lauderdale, Fla. 33338 **(S3)** 305-561-9334
Showtime Entertainment, Inc., 1211 Ave. of the Americas, New York, NY 10036 **(S4)** 212-575-5175
Southern Satellite Systems, Inc., P.O. Box 45684, Tulsa, OK 74145 **(S9)** 918-664-4812
Systems Wire and Cable, Inc., P.O. Box 21007, Phoenix, AZ 85036 **(M3)** 602-268-8744
Tele-Wire Supply Corp., 122 Cutter Mill Rd., Great Neck, N.Y. 11021 **(D1, 2, 3, 5, 6, 7, 8, 9)** 516-829-8484
T.E.S.T., Inc., 16130 Stagg St., Van Nuys, CA 91409 **(M9 Encoders & Decoders)** 213-989-4535
TEXSCAN Corp., 2446 N. Shadeland Ave., Indianapolis, IN 46219 **(M8 Bandpass Filters)** 317-357-8781
Theta-Com CATV, Division of Texscan Corporation, 2960 Grand Avenue, Phoenix, AZ 85061, **(M1, M4, M5, M7, M8)** 602-252-5021
TIMES WIRE & CABLE CO., 358 Hall Avenue, Wallingford, CT 06492 **(M3)** 203-265-2361
Tocom, Inc., P.O. Box 47066, Dallas, TX 75247 **(M1, M4, M5, Converters)** 214-438-7691
TOMCO COMMUNICATIONS, INC., 1077 Independence Ave., Mtn. View, CA 94043 **(M4, M5, M9)** 415-969-3042
Toner Cable Equipment, Inc., 969 Horsham Rd., Horsham PA 19044 **(D2, D3, D4, D5, D6, D7)** 800-523-5947, In Penna. 800-492-2512
Triple Crown Electronics Inc., 42 Racine Rd., Rexdale, Ontario, Canada M9W2Z3 **(M4, M8)** 416-743-1481
TURNER COMMUNICATIONS CORP., (WTCG-TV), 1018 West Peachtree St., Atlanta, GA 30309 **(S9)** 404-875-7317
UNITED PRESS INTERNATIONAL, 220 East 42nd St., New York, NY 10017, **(S9 Automated News Svc.)** 212-682-0400
UNITES STATES TOWER & FAB. CO., P.O. Drawer "S", Afton, OK 74331 **(M2, M9)** 918-257-4257
United Video, Inc., 5200 S. Harvard, Suite 4-D, Tulsa, OK 74135 **(S9)** 918-749-8811
Van Ladder, Inc., P.O. 709, Spencer, Iowa 51301 **(M9, Automated Ladder Equipment)** 712-262-5810
VIDEO DATA SYSTEMS, 40 Oser Avenue, Hauppauge, NY 11787 **(M9)** 516-231-4400
VITEK ELECTRONICS, INC., 4 Gladys Court, Edison, NJ 08817 201-287-3200
Warner Cable Television, 75 Rockefeller Plaza, New City, N.Y. 10019
WAVETEK Indiana, 66 N. First Ave., Beech Grove, IN 46107 **(M8)** 317-783-3221
WEATHERSCAN, Loop 132, Throckmorton Hwy., Olney, TX 76374 **(D9, Sony Equip. Dist., M9 Weather Channel Displays)** 817-564-5688
Western Communication Service, Box 347, San Angelo, TX 76901 **(M2, Towers)** 915-655-6262/653-3363
Winegard Company, 3000 Kirkwood Street, Burlington, Iowa 52601 **(M2, M3, M4, M5, M7)** 319-753-0121

NOTE: Associates listed in bold face are Charter Members

Distributors

D1—Full CATV equipment line
 D2—CATV antennas
 D3—CATV cable
 D4—CATV amplifiers
 D5—CATV passives
 D6—CATV hardware
 D7—CATV connectors
 D8—CATV test equipment

Manufacturers:

M1—Full CATV equipment line
 M2—CATV antennas
 M3—CATV cable
 M4—CATV amplifiers
 M5—CATV passives
 M6—CATV hardware
 M7—CATV connectors
 M8—CATV test equipment

Service Firms

S1—CATV contracting
 S2—CATV construction
 S3—CATV financing
 S4—CATV software
 S5—CATV billing services
 S6—CATV publishing
 S7—CATV drop installation
 S8—CATV engineering

KEEP IT WORKING...

with the new CATJ
FM Video Transmission
Wall Chart!

Use the Order Card
between pages 48 & 49

ORDER
TODAY!

Continued from Page 53.

system operators, now and in the future. The Series 6700 meets the need created by the vast expansion of programming, and it addresses the increased concern on the part of cable system operators over theft of signal.

The set-top terminal is a microprocessor-based unit, which uses a programmable read-only memory (PROM) to authorize selection of any combination of up to 40 channels. The CATV system operator may specify blocks of channels to suit his tiering plan and receive pre-tiered terminals from Scientific-Atlanta. To change channel authorization, the system operator need only insert a different PROM in the subscriber's set-top terminal.

The set-top terminal may be easily upgraded in the field to provide descrambling for channels 15 through 54 where security scrambling has been added at the headend. For the terminal equipped with the descrambling circuitry to generate a clear picture at

the customer's television, the signal must be descrambled by the terminal and the channel selected must be authorized by the PROM. This two-step security approach is virtually impossible to defeat.

The Series 6700 can be upgraded to provide addressability from the headend. Changes in channel authorization may be addressed to individual subscribers simply by transmitting a signal down the cable. The signal alters the channel authorization on individual terminals without the expense of a visit to the home by a serviceman. This feature is easily added in the field.

The 6700 set-top terminal features a digital, touch-sensitive key pad and 10 channel programmability. An electronic parental-discretion feature for sensitive programming is available on units with the descrambling feature.

For more information on this innovations and new products, contact the Cable Communications Division, Scientific Atlanta, Inc., 3845 Pleasantdale Road, Atlanta, Georgia 30340, or phone 404-449-2000.

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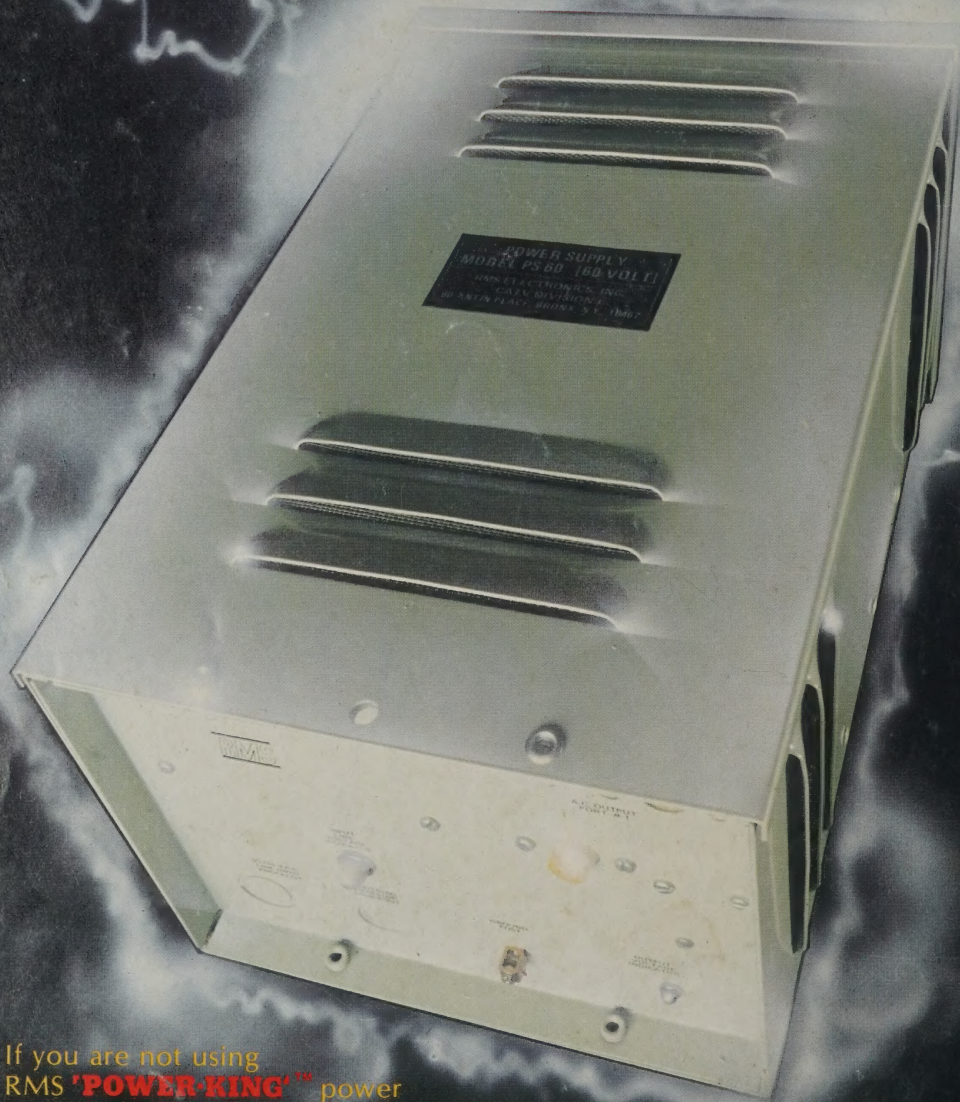
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